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ABSTRACT

The purpose of this hearing was to examine the status of the Star Schools program, a federal program enacted by Congress in 1987 that enables students to be linked together via satellite or cable TV hookup with teachers in different parts of the country. Star Schools are a network of distance education programs that link remote classes of students with teachers and courses to which students would not otherwise have access, by using communications satellites and other telecommunications technologies. It is noted that Star Schools programs exist primarily in rural areas where access to mathematics, science, and second language instruction is often unavailable by traditional educational means. In addition to the prepared statements, communications to various concerned officials, and responses to questions entered into the hearing record, this report includes transcripts of conversations that took place during a demonstration of the Star Schools technology between committee members and teachers and students in ongoing distance education classes. Prepared statements were provided by Senators Edward M. Kennedy, Orrin G. Hatch, James M. Jeffords, Strom Thurmond, Robert J. Kerrey, and Brock Adams; Gary Vance of the Satellite Educational Resources Consortium (SERC); Nancy Carson of the Office of Technology Assessment (OTA); Inabeth Miller of the Massachusetts Corporation for Educational Telecommunications; Gregory J. Liptak of Jones Spacelink and Mind Extension University; and William F. Werwaiss of Southern New England Bell Telephone. Responses to questions asked by Senator Kennedy were provided by Jeanne M. Tinnin of Kaycee Public Schools as well as Gregory J. Liptak, Nancy Carson, Gary Vance, William F. Werwaiss, and Inabeth Miller. Also included are communications to Amanda Broun of the Education Counsel of the U.S. Committee on Labor and Human Resources and Smith L. Holt and Malcolm V. Phelps of Oklahoma State University. These letters are accompanied by materials describing an advanced placement course in American Government offered by Oklahoma State University. (DB)

IR

S. HRG. 102-297

# STAR SCHOOLS FOR ALL OUR STUDENTS

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## HEARING

BEFORE THE

## COMMITTEE ON LABOR AND HUMAN RESOURCES UNITED STATES SENATE

ONE HUNDRED SECOND CONGRESS

FIRST SESSION

EXAMINING THE STATUS OF THE STAR SCHOOLS PROGRAM, A FEDERAL PROGRAM THAT ENABLES STUDENTS TO BE LINKED TOGETHER VIA SATELLITE OR CABLE TV HOOKUP WITH TEACHERS IN DIFFERENT PARTS OF THE COUNTRY

APRIL 24, 1991

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# STAR SCHOOLS FOR ALL OUR STUDENTS

WEDNESDAY, APRIL 24, 1991

U.S. SENATE,
COMMITTEE ON LABOR AND HUMAN RESOURCES,
*Washington, DC.*

The committee met, pursuant to notice, at 10 a.m., in room SD-430, Dirksen Senate Office Building, Senator Edward M. Kennedy (chairman of the committee) presiding.

Present: Senators Kennedy, Dodd, Simon, Harkin, Adams, Bingaman, Hatch, Thurmond, Durenberger, and Cochran.

Also Present: Senator Kerrey.

## OPENING STATEMENT OF SENATOR KENNEDY

The CHAIRMAN. The committee will come to order.

We welcome all of our students this morning to the Committee on Labor and Human Resources' hearing on "Star Schools for all of our Students" this morning, and we are in for a real treat.

We are going to have a live demonstration of the Star Schools program which Congress enacted in 1987. Star School means distance learning, the linking together of remote classes of students with teachers and courses to which they wouldn't otherwise have access, by using satellite and other communications technologies. This technology allows schools in the most rural areas with only a few students to access math, science and foreign language courses for those students even if the nearest teacher for those subjects is hundreds of miles away.

This morning we are going to link up the hearing room with several classrooms around the country where distance learning classes are taking place right now. We will eavesdrop on those classes and then have an opportunity to interact with the teachers and students at those distant sites.

I am going to ask members to withhold opening statements until the demonstration is over because we are viewing live classes which are taking place as we see them, and we must stick to a fairly strict timetable as we switch from class to class. An outline of the timetable for the next hour or so has been provided to members and guests at the hearing.

[The prepared statements of Senators Kennedy, Hatch, and Jeffords follow:]

## PREPARED STATEMENT OF SENATOR KENNEDY

Today's hearing on "Star Schools for All Our Students" examines a Federal program which has only been in place a few years,

but which has already had tremendous impact on schools and students across the country.

The Star Schools Program Assistance Act was first authorized in 1987. Since that time, the Education Department has awarded grants to 8 multi-State networks which provide live interactive instruction to students in every State. These networks have provided math, science, foreign language, and other courses to thousands of schools and tens of thousands of high school students and their teachers.

More and more elementary school students are receiving Star Schools courses too. By linking together remote classrooms and the best teachers, Star Schools has turned one-room school houses from Forest, MS to Tok, AK, into windows on the best instruction in the Nation. We have truly taken satellite technology to create "Star Wars" and used it to create "Star Schools."

Yesterday, I, along with several other members of the committee, Senators Cochran, Metzenbaum, Dodd, Simon, Adams, Wellstone, and Durenberger introduced reauthorization legislation which builds on the most important elements of the Star Schools program—our focus on underserved elementary and secondary school students. At the same time, we propose to extend the reach of the technology to other groups, such as children in hospitals and other institutions? And after the school day ends, learning can continue through teaching the illiterate to read and immigrants to speak English. The capacity of this technology is virtually limitless. But much of it goes unused for hours each day, when students of all ages could benefit from it. This legislation will encourage educational networks across the country to use the technology to the maximum extent possible.

This morning's hearing will demonstrate Star Schools by linking together the hearing room with schools around the country which are taking Star Schools courses. And then we will hear from some experts about moving in these new directions, and what role the business community can play to facilitate this growth.

American students rank below students in other nations in international tests of math and science achievement. Studies show that they have less access to these courses than students abroad, which helps explain their poor performance. But with increased access through Star Schools, and greater focus on these subjects through the National Education Goals, we can close this education gap and restore excellence to our schools.

PREPARED STATEMENT OF SENATOR HATCH

I am pleased with the presentation that was prepared for us this morning. I know that, in Utah, even though we are not involved in the Star Schools program, there is an increasing use of satellite technology. This technology is especially important in the rural areas of our State where it is sometimes difficult to get qualified teachers in specialty areas, and where there are often not enough students to justify holding a class when a qualified teacher may be available.

I look forward to reviewing the discussion about the reauthorization of this program. I would like to gather more information about

how widely this program is available. I have heard that this program is operated in every State in the Union; yet, our education office in Utah has told me that it is not operating in Utah. I would be interested in finding ways to ensure that this technology is available to every school that wants it, especially to schools in rural areas, which arguably are those who have the greatest need for satellite technology. I would like to work with you, Mr. Chairman, to ensure that this program reaches children in States which are heavily rural. At the same time, I recognize the budgetary constraints we face.

PREPARED STATEMENT OF SENATOR JEFFORDS

Thank you, Mr. Chairman for calling this hearing together and for the reauthorization legislation you have introduced on Star Schools.

The programs provided by Star School grants are particularly important to small rural States, such as my own. Our elementary and secondary schools are fine institutions but often lack the necessary resources to remain state-of-the-art in every discipline. Further, outside teachers or special programs are often not available to Vermont students because their schools are located in such rural, hard to serve districts.

The opportunities provided by Star Schools are key to bringing innovative and informative programs to our youngsters. In this world of ever changing technology to be behind is to be lost. Star School programming can be the means to keeping students current with events, interested in school and given the opportunity they deserve to have the best classes available to them.

I wholeheartedly support the reauthorization and look forward to working with you in the future on this endeavor.

The CHAIRMAN. I want to welcome Gary Vance, the executive director of SERC Network, one of the Star Schools programs we will see demonstrated this morning. Mr. Vance is going to lead us through the demonstration, explaining as we go what we are seeing.

Gary, we're glad to have you here.

STATEMENT OF GARY VANCE, EXECUTIVE DIRECTOR, SATELLITE EDUCATIONAL RESOURCES CONSORTIUM [SERC]

Mr. VANCE. Thank you, Mr. Chairman. I do want to say that it certainly is an honor for me to be here today and get to share with you a very great success story, the story that we have experienced over the last several years.

For example, the organization that I represent, the Satellite Educational Resources Consortium, or SERC, has been in existence only a short 3 years. But since that beginning just 3 years ago, SERC has now grown into a 23-State consortium that includes the States of Mississippi, South Carolina, Ohio, and Iowa, represented on this committee, and we have been able to do some things that we are very proud of.

We are a consortium that continues to grow, and of course, that rapid growth wouldn't have happened were it not for the fact that we were a recipient of the very first round of Star Schools funding

that was initiated by this committee. So I want to take this opportunity to publicly thank you, the members of the committee, and the Congress of the United States, for making that possible.

Today it is going to be my pleasure, as Senator Kennedy has indicated, to take you on a tour. We are going to be taking a tour to Nebraska, Kentucky, Washington, and Oklahoma and a few other States, as we visit several distance learning programs that have been funded through the Star Schools program.

In addition to visiting two courses that are produced by SERC, you will also have a chance to interact with students in a course that is offered by Oklahoma State University which, like SERC, was the recipient of a grant in the first round of Star Schools funding; you will also have a chance to talk with students in a middle school science class, a program that comes from Spokane, WA, offered by STEP, the Satellite Telecommunications Educational Programming Network, and STEP was the recipient of a grant in the most recent round of Star Schools funding.

What you are going to be seeing in these segments that we'll look at in just a few minutes will be a demonstration of how technology is being used to serve education. And as you view and participate in these programs, there is going to be a little bit of a tendency to want to focus on the technology—in fact, I have seen a few of the Senators looking at the boxes that we have placed at your desks. It is important that you do focus on the technology because we are going to be connected to students and teachers by satellite, by telephone and by computer interaction. But what I hope you will focus on as you see what we are doing is the true magic of what this is really all about. It is the magic of kids learning, of kids being turned on to education, of sharing their ideas and parts of themselves with their peers and teachers all across the country. I do hope that this comes across to you today. The educational opportunities afforded through distance learning, things that we have all had the chance to see for the last two and a half years, truly are changing lives day in and day out for the students across the Nation.

And since I have been designated as the "MC" of what we're going to see, let me just take a moment to briefly explain what you will be looking at—and I will review this as we go along.

First of all, you will be taking a look at a physics class. We will see that particular segment on a videotape, for reasons I'll explain in a little bit, and you will see one kind of interactivity that is being used in distance learning today, the keypad technology I mentioned just a couple of moments ago.

You do all have keypads in front of you, and these are the instruments that provide immediate feedback to both students and teachers during the classes every day that they are involved in.

The second class that we'll be taking a look at is a Japanese 1 class, one of SERC's most popular classes. The third class will be an advanced placement, or AP, American Government class from Oklahoma State. The fourth will be a group of middle school science students from the STEP program in Spokane.

Part of what we want to do today is to give you a flavor of what it is like to be part of a distance learning class, and we certainly want you to be able to ask questions of the folks who are truly the

star witnesses at this hearing—the students and teachers involved in the program.

To accomplish this, while we are involved in certain segment of the class, your microphones will be connected to the telephone audio-bridges that we use every day to connect the students to the teachers and to each other.

So we encourage you to ask questions. I don't want to say you won't be able to leave until you ask one, but we certainly hope that you have some questions to ask. The students will be coming from around the country, and you might want to ask them questions either about the substance of their particular class or about their experience in this type of learning in which the teachers and students are separated by hundreds of miles.

The very first thing that we're going to do to get you into this—because I think it is true that oftentimes a picture is worth a thousand words—is to give you a little bit of a better idea of what distance learning is all about, what we are talking about when we connect satellite dishes to student classrooms, and so on. And I think a very good way that we can do that is to give you a quick overview by having you take a look at a videotape that shows how the Star Schools program works.

The particular tape that you are going to see is one that was prepared by STEP, the Pacific Northwest Educational Telecommunications Partnership. Later, as I mentioned before, you will have an opportunity to interact with students involved in one of those classes.

So if I could stop at this point, why don't we take a look at this tape, and you'll get a chance to see what Star Schools is all about.

[The prepared statement of Mr. Vance follows:]

PREPARED STATEMENT OF GARY VANCE

Mr. Chairman and members of the committee: My name is Gary Vance. I am executive director of the Satellite Educational Resources Consortium (SERC), a leading national nonprofit provider of distance-learning courses, based in Columbia, SC. I am pleased to be here today to report back to you on an investment you made 3 years ago when you created the Star Schools program.

Because you sent clear signals about the objectives to be accomplished, you targeted an area of need that was particularly urgent, you specified that technology was to be a key ingredient in addressing that need, and you set forth enough guidelines to ensure that funds were allocated appropriately, we have a wonderful success story to tell. So, first, on behalf of the education community, thanks to each of you for the public policy you put into place 3 years ago.

SERC offers a compelling example of how Federal funding can stimulate local and State initiatives to achieve a cooperative effort that otherwise would simply not have been possible. SERC was one of four multi-State consortia that received funding for the first 2 years of the Star Schools program. SERC is a consortium of State departments of education and State educational television networks. These two agencies in each State have been working together for years to deliver quality instructional television to local school children on a national scale. It was only natural that the SERC partnership be formed on the basis of those working relationships. SERC represents a 5-50 partnership between those officials responsible for curriculum in each State and those with the technical expertise to deliver the courses via the best technology available.

Back in 1988 when SERC applied for Star Schools funding, we had 18 members; today, with the recent addition of two States, Michigan and New York, we have the following 25 members:

Alabama, Arkansas, Florida, Georgia, Iowa, Kentucky, Louisiana, Maine, Michigan, Mississippi, Nebraska, New Jersey, New York, North Carolina, North Dakota,

Ohio, Pennsylvania, South Carolina, Texas, Virginia, West Virginia, Wisconsin, and Detroit, MI, Kansas City, MO, and New York City.

A number of additional States are on the verge of joining SERC. Membership is open; we hope all 50 States will join in the next few years.

SERC met your committee's call to address the need for advanced math, science, and foreign language courses for geographically and economically disadvantaged schools. This year, students in small, remote high schools, some with fewer than 500 students in all 4 grades, are able to take Japanese, Russian, Advanced Placement Economics, Discrete Math, World Geography Honors, Physics, and Probability and Statistics.

The growth in enrollment in SERC courses has been phenomenal and exciting, as the graph on the following page illustrates. We started with a pilot semester involving 59 schools and 363 students with two courses. Last year, 3500 students were enrolled in credit courses. This year, in just our second full academic year of operation, we already have 700 schools in 23 States linked to the network, and almost 5400 students are enrolled in 10 high school credit courses. In fact, we had to turn students away this year because we were not able to handle the demand. Equally important is the fact that SERC now has the infrastructure to grow—adding more schools and more courses.

Attached as Appendix A is a list of the courses that SERC has offered with the help of Star Schools funding over the past five semesters, since the spring 1989 pilot semester.

More important than the total numbers of students and schools served are the characteristics of SERC schools. Last year 79% of SERC schools were eligible for Chapter I funds; this year 71% are eligible. One-third of our schools have enrollments of less than 500 students; 75% have less than 1,000 students. This year 22% of SERC's students are minorities; 15% are African-American.

As you can see, Mr. Chairman, we are serving precisely the student populations that you and this committee identified as the principal beneficiaries of Star Schools: students in poor or rural school districts that would otherwise be unable to offer these college-oriented courses to their students.

## *How Do SERC Classes Work?*

Today you will see two SERC classes in progress. In fact, everyday 17 SERC classes meet, via satellite and audio-bridge, for live classroom instruction. These classes are taught by highly qualified and experienced master teachers located in four different States.

Although the class may involve as many as 300 or 400 students in 23 States, there are normally no more than 4 students—and sometimes only 1—taking the class in any one school. We require a classroom facilitator to be in the room with the students to coordinate the class at the school, but, in general, the students manage their own classes, working closely with the student workbooks and their textbooks.

Depending upon the subject, the students may be on-line (on the telephone) throughout the class. (Some classes rotate which schools will be on-line.) The students can be expected to be called upon, by name, just as though the teacher were in their classroom, and they likewise may ask questions of the master teacher.

SERC courses are full-credit, graded classes, just like every other course that the student takes. Each of our courses is fully accredited in each participating state (due in large part to the participation of State departments of education in determining our curriculum offerings). Each master teacher prepares tests for the students and the exams are returned to the master teacher for grading. SERC sends a numerical grade to each student's school at the end of each 6 weeks, the semester, and the year. The classroom facilitator in the local school assigns the final letter grade, based upon the individual school's system of converting numeric scores to letter grades.

Our language courses operate a little differently so that we can expose our students to native speakers. Students are divided into groups of 10–12, and on the telephone days each week, they call and speak with native speakers for 20 minutes of conversational class. These are highly structured classes, and the students are graded on their participation and performance.

Teachers and tutors are available after class and throughout the day during office hours. Students and classroom facilitators are encouraged to call and talk with the teacher if problems occur. We use the feedback from the facilitators to help gauge the pacing for the class and identity problems to resolve.

Mr. Chairman, while you may initially be captivated by the technology that the Committee will see this morning, for our students the technology very quickly be-

comes secondary, merely a part of the classroom background. As one of our students recently commented, "The technology becomes transparent." And the focus becomes not the technology but the subject matter of the class.

We do not maintain that SERC courses are as good as having the class taught by a qualified, experienced teacher who is physically present in the classroom. But the whole point is that for these specialized, critical courses, our schools do not have (and are unlikely to be able to afford) the teachers who can teach these courses. Without Star Schools the students in these schools would simply not be able to take classes in these subjects—subjects that will contribute significantly to their success in college.

The following State departments of education and their respective educational television networks are producing the SERC credit courses for high school students this year:

Alabama—World Geography Honors—(Produced in association with the University of Alabama at Tuscaloosa)

Kentucky—Physics—Discrete Math—Probability and Statistics

Nebraska—Japanese I and II

South Carolina—Russian I and II—Advanced Placement Economics—Macro and Micro

In addition, Fairfax County Public Schools in the Washington, DC area, produces our student science seminars—enrichment seminars designed to be used by science teachers in the SERC schools. And three additional States are producing extensive teacher in-service and staff development programs after school in the afternoon: Louisiana, New Jersey, and Wisconsin.

## *How Important Was Star Schools Funding?*

It is highly unlikely that so much could have been accomplished so quickly, with the level of cooperation that characterizes SERC, without the Federal Star Schools money. Although some of the research and planning for SERC had already been completed, the funding gave just the incentive and encouragement that was needed to move widespread distance-education from the drawing board to the classroom. Particularly in light of what has happened to local and State education budgets in the past 2 years, I am quite sure SERC would still be in the concept stage if it were not for Star Schools.

SERC has used the Star Schools money to leverage both financial support and the time commitment of scores of education officials. It has used the Federal support to attract financial commitments from both the public sector (through State and local education agencies) and the private sector (through corporate and foundation support).

Table 1 on the following page offers a detailed explanation of how SERC leveraged Star Schools funding to attract State and local funds. The matching funds were used in large part to equip schools with satellite receive equipment and classroom technologies, including the interactive keypads used for the math and science courses. The first-year Star Schools grant of $5.6 million generated an additional $5.2 million in State dues, equipment matches and student fees. The second-year grant of $4.1 million generated $6.1 million from State membership fees, student fees and foundation funding. In all, with an investment of $9.7 million, SERC has generated an additional $11.3 million for equipment and course production and delivery.

As these numbers suggest, SERC did not use the Federal money to offer a free ride to States and local schools. From the beginning each State joining SERC put up $20,000 for an annual membership fee. This year, that annual membership fee increased to $35,000. In addition, either the State or the local school districts had to supply a match (often roughly 50%) for the satellite receiving equipment. Finally, each local school must pay a per-student fee for SERC courses. This truly is a Federal-State-local partnership in the fullest sense of the word.

In addition, we have worked closely with other Federal agencies and the Corporation for Public Broadcasting to ensure that SERC not only achieves the objectives of the Star Schools program, but other educational objectives as well.

We leveraged more than just dollars. We also used the Federal money to attract the production expertise, resources and goodwill of the educational television community. We leveraged people-power from curriculum specialists and education technology departments in our State departments of education.

We have also used the Federal money to attract private sources of funding. Just last month, for example, the Sony Corp. announced that it was giving SERC a grant for curriculum development. This year we have also used a grant from the Dodge

Foundation to plan for the expansion of our Japanese course, thereby enabling us to serve more students.

## DIVERSITY OF FUNDING

During the past 2 years, SERC has operated with funding not only from the Star Schools grant, but also membership dues and two grants from the Corporation for Public Broadcasting. These funds, have enabled SERC to stretch the positive impact of Federal dollars well into the 1990-91 academic year.

### TABLE 1. FUNDING LEVERAGED WITH STAR SCHOOL GRANT

| Grants | |
|---|---|
| First Year Grant: | |
| Star Schools first year grant to SERC | $5,600,000 |
| State and Associate membership dues | 382,500 |
| State and local match for equipment (budgeted) | * 2,243,000 |
| State match for productions (budgeted) | * 1,667,000 |
| School fee for student courses (estimate) | 900,000 |
| Fees for teacher in-service and graduate level courses (estimate) | 30,000 |
| Total leveraged from first year grant | $5,222,500 |
| * Based upon a 50-50% match of Star School funds. | |
| Second Year Grant: | |
| Star Schools first year grant to SERC | $4,101,000 |
| State and Associate membership dues | 695,000 |
| State and local match for equipment (budgeted) | * 1,230,300 |
| State match for productions (budgeted) | * 2,204,376 |
| School fee for student courses (estimate) | 1,792,873 |
| Fees for teacher in-service and graduate level courses (estimate) | 25,000 |
| Foundation Funding | 182,000 |
| Total leveraged from second year grant | $6,129,549 |
| * Based upon at least 25% match of Star School funds. | |

Unfortunately, Mr. Chairman, we are no longer eligible for Federal funding under the current legislation. But because of the broad nature of our partnership, we have managed to keep operating, serving our existing base of schools, without Federal support. Through the State fees, local school fees, and private support, we have managed to maintain our general operations without Federal moneys. Through increases in these fees, we have moved toward becoming self-supporting.

While the lack of Federal support has not caused us to cut back on our general operations, it has, however, meant that we have had to turn down schools and students who wanted to take our courses. We simply do not have the funds to help them get the equipment they need or to add the teachers and class sections necessary to serve the new students.

*What Do the Evaluations Show?*

SERC has had a commitment to evaluation from the first pilot semester. As a result, we have data from students, classroom facilitators, and principals about how SERC is working in their individual schools. The marketplace is a good rough-cut measure of effectiveness. After SERC's first full year of operation, 98% of the school principals said they wanted to continue with the program and expand their offerings; another 399 schools put up matching funds to get the equipment installed so that they could receive the programs. Enrollments climbed from 3,500 students to 5,400 students. And, we had to turn students away.

The education community is increasingly asking for measurements of learning outcomes—and we at SERC are trying to collect that information as well. Based

upon our first year of operation, we designed pre- and post-tests for our math and science courses. That data will be collected and analyzed at the end of this year.

Meanwhile, the Nebraska Department of Education conducted an independent assessment of the Japanese I course last year, with the participation of the other SERC State departments of education. We are pleased to report that the SERC students not only performed comparably to students in regular classes, but scored significantly higher in listening, written and total test performance (see Table 2 on the following page). Of course, there are several possible explanations for these differences, and we would urge caution in their interpretation. But, in fact, the results give us cause for optimism for using distance education methods in foreign language instruction.

TABLE 2. JAPANESE I ACHIEVEMENT IN SERC AND COMPARISON SCHOOL

| Measure | SERC Schools | | Comparison Schools | |
|---|---|---|---|---|
| | Mean | SD | Mean | SD |
| Listening Test | 15.99 | 3.16 | 14.38 | 3.01 |
| Written Test | 21.62 | 6.32 | 19.67 | 5.96 |
| Total Test | 37.61 | 8.90 | 34.06 | 8.26 |

Note: Achievement scores are based on *N*'s of 771 and 198 for SERC and comparison schools, respectively. The number of SERC schools represented in these data was 156 out of a total of 170 schools who participated in SERC Japanese I, while the number of comparison schools represented was 13. Total possible scores on the Listening and Written Tests were 20 and 30, respectively. This analysis represents data received by June 8, 1990.

We have a second independent comparison between students learning Japanese in traditional classrooms and our SERC Japanese students. Last spring, the State of Georgia held a statewide language contest which students across the State competed in several languages, including Japanese. Students were separated into two categories, one for students with classroom instruction only and another for students that had additional exposure to the language through native speaking parents. SERC students from Athens and Thomaston won first place in both categories and a second place honors in the second category. Attention was given to comprehension, pronunciation, vocabulary, overall competency in grammar and syntax, fluency and student initiative in conversing in Japanese.

The exhaustive evaluation data we have collected on student and teacher attitudes has helped enormously as our course curriculum teams have designed their courses. We are not only collecting valuable data about how to measure the effectiveness of distance education courses, we feel we will be able to make a valuable contribution to the overall effort measuring learning outcomes of all educational endeavors.

*What Are SERC's Plans for the Future?*

We anticipate over 7,000 students will be enrolled in SERC high school credit courses next year. We are adding 2 new courses to the 10 courses already offered: Latin and Pre-Calculus, both from Kentucky. We are expanding our capacity to handle twice the number of Japanese I students over the number we could accommodate this year.

In addition to expanding student course offerings, SERC will be offering 120 hours of teacher in-service and staff development courses, programs, and seminars. The offerings will be coming from Alabama, Louisiana, Missouri, Nebraska, New Jersey, and Wisconsin, working with State departments of education, colleges, and universities and special content experts. We are also hoping to work with several corporations in offering staff development programs next year.

We have just recently added two new States to SERC membership and expect several other States to join within the next year. It is our expectation that by the 1992–93 academic year we will be reaching well over 10,000 students daily with the advanced math, science, and foreign language courses they need.

*What Is the Unmet Demand for SERC Courses?*

Although we have significantly expanded the number of students and schools served by SERC, because of the lack of continued Federal support, we unfortunately have been forced to turn away many students who would have liked to enroll in our classes.

This year, for example, because of our requirement that language students have an opportunity to speak each week with native speakers, we had to limit our enrollments in Japanese I and Russian I to an average of just over 50 students per State

in each course. Most of our States simply had to limit the number of their schools that could offer these two courses in order not to raise student expectations. Private funding will enable us to add additional sections of the Japanese course next year, but even that will likely be insufficient to meet the student demand.

Perhaps even more disturbing than the fact that we had to turn away students who wanted to take our Japanese course is the fact that there are literally scores of small schools in virtually every SERC State that would like access to SERC classes but, because of the cost of the satellite dishes and other classroom technology, they are unable to do so.

When receiving Star Schools funding, we used the Federal money, on a matching base to outfit these small schools with the equipment they needed to participate in SERC classes. But now that we no longer receive Federal money, we are unable to provide the matching funds. We have had to focus our resources instead on serving our existing base of schools. The result, then, is that these other schools—and, more importantly, their students—remain unserved by SERC.

Serving the new schools that would like SERC classes means more than just outfitting them with the appropriate technology. It also means adding new sections of our classes and adding additional teachers and tutors, so that we can keep the number of students in each class at a manageable size.

Finally, we currently cannot afford to lease the satellite transponder tune beyond 6:30 p.m. eastern time. As it is, we are spending almost $1 million a year for satellite access just in peak daylight hours. Further Federal support would enable us to acquire additional hours of satellite tune, thereby using our substantial delivery system to provide a variety of after-hours (or evening) courses, such as adult literacy classes or vocational training. There is no reason that the satellite receiving equipment at the local schools should be used only during regular school hours, but we lack the financial resources to lease the transponder time that would enable us to offer courses to special student populations in the evening hours.

Mr. Chairman, the need is there—to serve more schools, to teach more classes, to reach new student populations with special after-hours courses. But without continued Federal support, we simply cannot afford to expand to meet these critical needs.

*What Elements in the Legislation Led to SERC's Success?*

Several key elements in the Star Schools authorization legislation were instrumental in getting SERC off to a strong start. The requirement that State and local educational institutions be involved with educational television entities enabled us to build on existing relationships. The priority given to multi-State consortia helped us maximize the resources through distance-education technology. The match requirement of no less than 25%, while difficult for some of our States and schools, has given all of our partnerships an ownership interest in the project. The focus on advanced math, science, and foreign languages has kept our priorities straight and served as an organizing force when other agendas presented themselves. And, the preference for serving Chapter I schools has kept our focus on those schools where SERC courses will accomplish the most good. We urge you to keep these provisions in the reauthorization bill as well.

*What Does SERC Need Star Schools To Offer Now?*

As testimony about the SERC success story suggests, this committee displayed considerable fought and wisdom in the way it drafted the Star Schools authorizing legislation. Consequently, the number of legislative changes that we are recommending is small.

First, we believe Congress should extend the underlying authorization for Star Schools. As our experience demonstrates, this program offers an effective way of providing quality courses to students who otherwise would not have access to classes in these subjects. It merits reauthorization.

Second, we encourage Congress to make the Star Schools program an integral part of the Federal support for education. We suggest that it may no longer make sense to call this a demonstration program. SERC, and the other Star Schools consortia, have demonstrated the success of this distance-learning technology, and this success argues for making Star Schools a regular part of the Federal education effort.

Along this line, we are pleased that the President has included funding for Star Schools in his 1992 budget. We believe that an effective balance can be achieved between the funds that are used to acquire equipment and the funds that go to develop and produce instructional programming—a balance that will enable us to meet the needs of remote or disadvantaged schools for the satellite receiving equipment while at the same time improving the variety and quality of the courses we are offering.

Let me be clear, though, Mr. Chairman. We are not asking for Federal funds for the regular operating budget of SERC. We believe this should be self-supporting. Rather, the Federal moneys can best be used to help us reach additional schools and students with additional courses.

Third, we recommend that the annual authorization level be at least $50 million. We recognize the spending constraints that confront the Appropriations Committee, but we are also aware of the literally hundreds of schools that still desire equal access to educational opportunities—particularly in math, science, and foreign languages. An authorization of at least $50 million annually would afford the appropriators greater flexibility in meeting this need.

Finally, and from SERC's perspective, most importantly, we urge you to allow those of us who have received Star Schools funding in the past to be eligible for continued Federal support. Because all States are now covered, at least potentially, by the eight Star Schools projects that have already been funded, the committee's initial goal of ensuring broad geographic distribution has been achieved.

We encourage this change for three primary reasons. First, we have invested substantial sums (not just Federal, but State and local as well) in an expensive and sophisticated delivery system. Because we now have this infrastructure in place, we can add new schools, more students, and additional courses for oniy incremental costs. This offers the most efficient use of Federal dollars. Requiring the creation of new networks as the prerequisite for securing further Federal support means, in effect, that a given level of Federal funding will reach fewer students than if the existing consortia could be the providers. In short, Congress can reach more students with the limited Federal dollars available if those of us who have developed an elaborate infrastructure are allowed to be the providers of the distance-learning courses to new schools and students.

Second, we have developed a record of experience and quality performance. We have shown that we can provide courses that meet the highest professional standards of the educators in our participating States. Equally important, we have learned, through hard experience, how to make this technology work in the practical classroom setting. There is no need for Congress to require other entities to repeat our experience and go through the trial-and-error learning process that we went through. Mr. Chairman, when you have a partnership that has learned how to do something well, it makes sense to use that partnership's experience and expertise to the fullest extent possible.

Third, we have substantial needs that, without Federal support, we will simply be unable to meet. As I mentioned earlier, we have literally hundreds of schools—with potentially thousands of students—that would like to participate in SERC. Unfortunately, now that our Federal funding has run out, we are having to say no to them. We simply are unable to accommodate the added costs involved in supplying them with the equipment and the courses. Allowing us once again to receive Federal funds would enable us to serve the additional schools that would voluntarily choose to offer SERC courses to their students.

Mr. Chairman, we have also had a chance to review your prepared legislation reauthorizing Star Schools. We fully support language allowing existing Star Schools consortia to apply for continued funding and increasing the level of funding. We also, however, have two primary concerns.

While we support efforts to reach additional populations, and expect to be working with state and local officials to see how SERC courses can be made available to other types of students, we are concerned that the Department of Education could interpret the language to create a funding priority for serving these new groups rather than simply permitting this expansion. Given the small amounts of money that are available for Star Schools, there simply is not adequate funding for Star Schools to meet its initial goals (providing math, science, and foreign language to small or disadvantaged schools) and also place a priority on serving these new populations.

We support working with the business community and are happy to include private sector participants in our partnership. We are concerned, however, that the current legislation allows for-profit companies to be the actual grantees of Star Schools funds. We would suggest that only public agencies or nonprofit entities be eligible to receive the grants. They in turn, then contract with the private sector partners for necessary services and equipment.

Our overall concern is that the legislation shifts the general focus of Star Schools from its initial mission of providing math, science, and foreign languages to schools that would otherwise be unable to offer these classes to a new priority of providing a variety of different educational services to a host of new populations. Under the current appropriations levels, there simply is not enough money to do both. We

would encourage the committee to keep its emphasis on the original objectives of Star Schools.

In conclusion, Mr. Chairman, SERC's experience has validated the wisdom of the committee in creating the Star Schools program. We have shown that you can use this technology to provide quality academic instruction to students in small, disadvantaged schools that would otherwise not be able to offer these advanced math, science, or foreign language classes to their students.

But we have only begun to exploit the possibilities offered by the technology. We ask that the committee reaffirm the Federal commitment to the Star Schools program and allow those of us who have mastered the use of this technology to again be full partners with the Federal Government in helping ensure that all students—no matter how poor, small, or rural their schools—have access to the courses they will need to perform well in college and be competitive in the international marketplace of the 21st century.

We look forward to working with you and your staff in a collaborative effort that uses distance-learning technology to help achieve America's long-term educational goals.

## APPENDIX A

[SERC Courses and Seminars 1989-91]

| | Number of students | Number of teachers | Number of sites |
|---|---|---|---|
| SPRING 1989 ACADEMIC COURSES (PILOT SEMESTER) | | | |
| **High School Credit Courses** | | | |
| Probability & statistics | 162 | | |
| Introduction to Japanese | 202 | | |
| **High School Non-Credit Courses** | | | |
| Science, technology and society series | 14,655 | | |
| **Teacher College Credit Courses** | | | |
| Advanced placement calculus for teachers | | 36 | |
| **Teacher In-Service Program** | | | |
| University of Wisconsin Teleconference Series | | 3,292 | |
| 1989-1990 ACADEMIC YEAR COURSES | | | |
| **High School Credit Courses** | | | |
| Japanese I | 921 | | |
| Russian I | 788 | | |
| Probability and Statistics | 549 | | |
| Discrete Mathematics | 582 | | |
| AP Economics: Macroeconomics | 368 | | |
| AP Economics: Microeconomics | 336 | | |
| **High School Non-Credit Courses** | | | |
| Science, technology and society seminars | | | 134 |
| **Teacher College Credit Courses** | | | |
| AP calculus for teachers | | 20 | |
| **Teacher In-Service Programs** | | | |
| Current issues in education (workshops/forums) | | 477 | 122 |

## APPENDIX A—Continued

[SERC Courses and Seminars 1989–91]

| | Number of students | Number of teachers | Number of sites |
|---|---|---|---|
| Algebra I for teachers | | | 58 |
| Teacher training in inquiry-based science | | | 158 |
| 1990–1991 ACADEMIC YEAR COURSES | | | |
| **High School Credit Courses** | | | |
| Japanese I | 1,121 | | |
| Japanese II | 278 | | |
| Russian I | 786 | | |
| Russian II | 163 | | |
| Probability and Statistics | 684 | | |
| Discrete Mathematics | 738 | | |
| AP Economics: Macroeconomics | 310 | | |
| AP Economics: Microeconomics | 277 | | |
| World Geography-Honors | 434 | | |
| Physics | 618 | | |
| **High School Non-Credit Courses** | | | |
| Science, technology and society series | | | 20 |
| Pre-college guidance information series | | | 253 |
| **Teacher College Credit Courses** | | | |
| Methodology and curriculum development in second language instruction | | 37 | |
| Educational psychology of critical thinking skills | | 18 | |
| Special studies: Improving the high school | | 12 | |
| **Teacher In-Service Programming** | | | |
| Engligh as a second language in-service workship | | | 83 |
| Technology education: Implementation of a new curricum preparing students for the 21st century | | | 19 |
| Videoconferencing: Its power for professional development | | | * 9 |
| Science and technology workshops for teachers 8–12 | | | * 20 |
| Strategies for improving schools teleworkshop series | | | 150 |
| Foundations for the future: Career development at the elementary level | | | 350 |
| Making the dream work for our children: A new vision of school guidance | | | * 120 |

* Enrollment remains open.

[Due to the high cost of printing, the additional material submitted by Mr. Vance is retained in the files of the committee.]

[Star Schools overview videotape from STEP network in Washington State shown.]

Mr. VANCE. As you can see, you are looking at technology, and the things that we are able to do are to truly be able to link people together from any part of the United States, link them to the resources they need no matter where they may be located geographically—and I hope that does come through. But please notice the

network of people who sit behind the classes. Not only do we have an instructor on line, talking to the teachers; we have tutors available; we have other support people who are interacting with the kids. And I think as you see some of the other classes we're going to get a look at, you'll see that with a network, almost a family develops in these classes. It does take the distance out of this kind of learning.

We are going to switch now and take a look at one of the first high school courses that I mentioned, the physics course that is put together by the Kentucky educational television network out of Lexington.

Kentucky is in the unique situation of having its own very strong model of distance learning that it offers for students in the State of Kentucky, but as part of our consortium, the SERC consortium, they are also able to make these resources available to students in the other 23 States.

We are going to look at a segment of their class on videotape. I mentioned that the first one would be taped. And the reason we want to do that is to give you a chance to look at this other kind of interactivity that I mentioned.

You all have been given keypads, and those keypads have a series of numbers on them, yes/no keys, and so on, and by using those little boxes that sit on the students' desks, they are able to interact with their teachers in real time, and the teacher gets immediate feedback as to what is going on with the students in response to a question that he or she may be asking; it helps keep track of students' progress; the teacher knows whether the class is with him as a whole and also whether specific students need help.

We decided to show you this segment on videotape so that we could be sure and highlight a section of a class that is making use of this particular kind of technology. So we'll take about 5 minutes and look at a physics course done for Kentucky educational television and also offered to the Nation through SERC.

So if we could see that tape, please.

[High school physics class (SERC) videotape shown.]

Mr. VANCE. These are the results of keypad answers that the students are punching in. [Pause.] If you were the student, you would be pushing the "A", "B" or "C" response for this particular answer. The little keypad that you have in front of you would give you immediate feedback as to your answer, but then the answer would also be transmitted through a computer and a telephone line to Lexington, KY, which would make it appear on their television screen.

I hope that little segment does show you that this kind of technology very much keeps the teacher in tune with what the students are doing. He is not just standing there, lecturing into a television camera and hoping the kids are getting it on the other end. He and the students are very definitely connected with what is going on.

I don't know if Chuck Duncan, the teacher here, knew that we would be using this particular segment before a Senate committee. He does a very excellent job with his classes, and they are having a lot of success.

I do need to warn you, too, I'm not here as a witness for physics, so don't ask me any questions because I didn't have the benefit of this class when I was going through school.

We were in Lexington, KY in this particular class just now, and now we are going to move a little farther West and move to Lincoln, NE. We'll move moving live to another SERC class. As I mentioned, Japanese 1 is one of the most popular classes that SERC is able to offer, and I think there are three reasons for that. One, Japanese is a language that a lot of students around the country and a lot of schools have identified as something that they want to get involved in, for a lot of reasons. Second, this particular class has a very strong instructional team behind the class, and in fact some of the original results of our studies on learning outcomes that have been done have indicated that this particular class comes out very, very favorably when we measure the learning outcomes of this class as compared to students in traditional classes. We plan to continue that kind of work.

Then the third factor is you are going to meet a very charismatic teacher. I think sometimes you have these lucky accidents. Tim Cook, who is the teacher involved with this Japanese class, was travelling through Hawaii from China to somewhere back in the United States, and he read a job ad on the bulletin board in the airport—and that's how we got Tim Cook after a thorough search for people around the Nation. He has been with us from the very beginning. He was in the pilot course that we initiated in spring of 1988, and he continues to be with us and is a very excellent teacher, as I think you'll see.

So what we're going to do now is join that class for about 5 minutes as observers. We won't ask you to interact at this point in time, but we will come back to this class at the end of the time, at about 10 minutes to 11, and Senators will have a chance to interact not only with Tim, but some students he has in the studio today working with him on some skits and some students that we have on-line from the various States.

So we'll now go to Lincoln, NE and join the Japanese class.

[Live Japanese class (SERC) telecast from Lincoln, NE.]

Mr. VANCE. These are students from the class. They would normally be in the high school and have been invited into the studio for participation on this day. I assure you it really was done before we ever knew we would be here for this hearing today; but this is done from time to time.

You should also have a copy of the textbook that is used in this class sitting in front of you, and I believe we have highlighted the lesson that they are working with today. So if you'd care to look at that, you can see some of what the students have as backup for the kind of work they are doing every day.

Today there will be almost 1,200 students taking this particular class in three sections, and they will be interacting with Tim as you see here 3 days a week, and then on Tuesdays and Thursdays, since conversational practice is very important, they will be interacting with native-speaking Japanese, 25 of whom are located in a lab that we have in Lincoln, NE. And this course is so popular that we are doubling the size of that class for next year, and we are going to open up another language proficiency site in New Jersey.

For some reason, we ran out of native Japanese speakers in Nebraska, but we found a few more in New Jersey, and we will be opening up another lab because that ratio of approximately one tutor to ten students is so extremely important. It is not one teacher teaching 1,200 kids. So we'll be able to double the size of this class for the coming year, and we are very excited about that.

One other thing I might point out is that an advantage we gain from using television as one of the teaching mediums is that you do get to see the Japanese characters superimposed on the screen. We have an instructional design team that works with that kind of thing. So we are using a multimedia approach to the teaching, so that the visuals can appear right during the appropriate times with the teaching, and that's a strength I think you'll find in any distance learning program if you are able to bring that to it.

The students you hear, of course, with the voices that sound slightly different are the ones that are on the telephone line. They are connected through an audio-bridge that can handle up to 150 calls. That is located at our headquarters in Columbia, SC, but the students can be connected through this class or another class and are interacting from the various schools around the country with the teacher as the class is going on.

OK. We will be joining that class again, or at least some of the students who are left from it, at 10:50 when the class ends, and that is when you'll have an opportunity to ask either the students or Tim Cook some questions—and I hope you will have some.

We are going to switch now, though, and move on to Stillwater, OK, where we're going to have the opportunity to join the AP or advanced placement American Government class that I mentioned. And again, you will be watching this class for about 5 minutes, and then it is your turn. We have scheduled time in this presentation for you to be able to interact with the teacher, Bob Spurrier, and with some of his students. And the subject may be very appropriate since we are dealing with American Government, so feel free to talk to the students either about the class—they may wish to ask you questions—or certainly, ask them about their experience with distance learning.

So let's move on to Stillwater, and we'll look at the Oklahoma State University program in American Government.

[Live Advanced Placement American Government class telecast from Oklahoma.]

The CHAIRMAN. I want to thank you for the opportunity to interrupt the class, Mr. Spurrier. This is Ted Kennedy speaking to you from Washington, DC. The members of the Senate Labor and Human Resources Committee have been watching and listening in on your class for the last 5 minutes or so, and it is very good of you to allow us to participate. It is also fascinating to watch how the lawmaking process is taught. [Laughter.] We in Congress try and stick to those rules that you have been outlining very closely, but it is always helpful to have a refresher course every now and then.

Let me mention how valuable your contribution today will be. When we are considering legislation, we often call upon experts to testify before the committee about their experience with a program, and this testimony helps the committee to include the best ideas on the legislation.

Today, you are our experts on the subject of distance learning, and the Star Schools program which we are considering today is a program which provides Federal funds to enable students like you to take distance learning classes like this AP American Government class. So we will be very interested to hear your views on how well it is working and the pros and cons of taking a course over the television.

I understand that we have students on the line from Ohio, Mississippi, Illinois, West Virginia, Wyoming, Alabama, as well as the students in the studio from Oklahoma.

Let me mention that for any of you who are participating in the class today who do not have the chance to speak, we always accept written testimony from the witnesses, so if you would like to write a letter or statement to the committee, we will include it in the hearing record.

Let's start of with a substantive question. I gather you have been studying the roles of the different branches of government. Do you have any views about Congress' role in the area of social programs?

Why don't we start with Chuck Lester, a student in the studio.

Mr. LESTER. The role of Congress in social welfare programs is important; it is also very large. When I say it is important, there are people in the country who really need the help, but I feel that there is probably some waste in the system that could be trimmed back so the people who really need it could get more. But I feel it is a very important program.

The CHAIRMAN. Good. Let me, if I could, go to your views about distance learning and invite members here to feel free to ask any questions at this time. A number of members of our committee are present—Senator Bingaman from New Mexico; Senator Simon from Illinois; Senator Kerrey from Oklahoma—excuse me, Nebraska—and Senator Cochran from Mississippi. We have the advantage here of having what they call the Congressional Record, so if you make a mistake like that, you can erase it. But unfortunately, in this program this morning, we can't do that. In any event, I do apologize to my colleague, Senator Kerrey from Nebraska.

Senator Durenberger and Senator Hatch were also here earlier. as well as other members.

Perhaps I'll ask my colleagues if they'd like to ask the panel out there any questions.

Senator Bingaman.

Senator BINGAMAN. Let me just ask—I have often wondered if technology in some cases doesn't get in the way of learning instead of facilitate it. I know the conventional wisdom is that it facilitates it because it does allow you to have access to excellent teachers, and I think that is certainly a benefit. At times, though, I wonder if the technology itself becomes the focus of attention, and you really don't get down to the substance of the subjects that you are trying to get into.

I don't know whom to address that question to, but I'd be interested in anybody responding who has participated in one of these classes, and telling me whether they think it is really a benefit.

Mr. SPURRIER. Let's throw that out to Cara Peterson at Fredericktown High School in Fredericktown, OH to start off with, and we'll pick up a couple other students as well.

Cara, are you on-line?

Ms. PETERSON. Yes. I don't think the technology of the program interferes at all. We learn just as much in this program as we would in a regular government class, maybe even a little bit more because it is more in detail. And with our teaching partner here at home, on the days that we don't have the program, we review, and she goes over everything with us. So it is actually a little bit more in-depth.

Mr. SPURRIER. Let's follow up on that and go to Steve Thomas at Spoon River Valley High School in London Mills, IL. Steve, how would you respond to the Senator's question?

Mr. THOMAS. Well, I personally believe and I think my classmates believe that we've gotten quite a bit out of the course, and I think that it really, really helps a lot in understanding certain things about government.

Mr. SPURRIER. OK. Let's go back to Chuck here in the studio. Perry High School students are close enough that they could almost drive down to see us live in the classroom here in Stillwater.

Chuck, do you see any advantages or disadvantages in the technology?

Mr. LESTER. Well, I'd say that the technology has helped me a lot because not only do you get to hear somebody lecture, but the graphics that are put up show the diagrams in our book so that even if, say, somebody doesn't read the book—which I know they should, but if they don't—they'll get the graphic anyway, because you put it up and you go over it in detail. So that is part of the technology.

I also like being able to call in. That's part of it, too. So I don't see any problems at all with the technology. If anything, it helps, and that's all it does.

Mr. SPURRIER. Senator, does that respond sufficiently to your question?

Senator BINGAMAN. It sure does. I appreciate the answers very much, and I'll let some of these other Senators ask some questions here.

The CHAIRMAN. Senator Cochran.

Senator COCHRAN. Thank you, Mr. Chairman.

I wonder if I could direct a question to Patrick Gordon down in Houston, MS, at Houston High School.

I notice that there are a few students there in the studio in Oklahoma. I wonder how many students are able to participate at the Houston High School, and how could we improve and enlarge the program by getting a larger number of students involved in the classroom setting—or is there a real limit as to how many students can participate at one time?

Mr. GORDON. Senator, we have three students that can take the Government class at Houston. I think originally we had more, but a lot of people are intimidated by it because it is an advanced placement course. But we do have seven signed up for next year.

Senator COCHRAN. That's good to know. Do you have any suggestions about how to relieve some of the concerns that students might have who do feel intimidated? Do you have any suggestions about how we can make it more relaxed or less intimidating?

Mr. SPURRIER. Patrick, do you want to follow up on that? Do you think the students are intimidated once they are in the course, or is it something that seems a little intimidating before they actually get in?

Mr. GORDON. Before they actually take it. Once I got in, I found it's really not too much above the high school level, but people are afraid it's going to be just like college, with a lot of papers to write, and stuff like that, and it scares them off.

Mr. SPURRIER. OK. I think the technology can sometimes be a little bit intimidating. Nathalie and I have found in the past that until you get people involved, even in the national communications system and things we've done with other telecoms, people are a little apprehensive until they begin work with the media, and then all of a sudden you forget about it, and you are just sort of there, and it becomes very natural.

Senator COCHRAN. Thank you.

Thank you, Mr. Chairman.

The CHAIRMAN. To follow up, how do students get help and assistance if they have questions after class, or if they have questions about homework? How does that work? Maybe the students can give us some reaction.

Mr. SPURRIER. OK. Let's go to Kaycee, WY and Jared Tinnin. We haven't been out there yet. Senator Kennedy has a question about can you follow up with us if you have questions after class.

Mr. TINNIN. Yes, you can call in on the toll-free number and ask any questions afterward, and also you can talk to your teaching partner if it is something that can be asked here.

Mr. SPURRIER. And Senator Kennedy, I might point out that the teaching partner is really a crucial link in the system the way we do it here from Oklahoma State University through the Arts and Sciences Telecom Service. The idea is that the teacher in the classroom is a certified teacher, not necessarily in social sciences, but there is always a certified teacher in the classroom working directly with the students and back and forth with Nathalie and me here in Stillwater. And we find that we get to know those teaching partners very well over the course of a semester.

Jared Tinnin out in Kaycee is one who we are on the phone with quite a bit, and it is something that really helps us know ahead of time if there are problems coming up and also provides a second source of information for the student beyond the 800 telephone number that is on-line here all the time.

The CHAIRMAN. Senator Simon.

Senator SIMON. Yes. First, I'm pleased to have London Mills, IL among those who are out there.

I am curious—we had an example of Japanese, and I can understand why you have to use this kind of system to teach something where there aren't teachers in many schools who can offer Japanese. But in a course like American Government, what is the advantage of doing this by satellite over the traditional kind of classroom setup?

I would be interested in a reaction from either teachers or students on this.

Mr. SPURRIER. OK. Let's go to Spoon River Valley High School out in Illinois and get their response.

Mr. THOMAS. Well, you have an actual college professor who has a much broader education with a doctorate. Some schools can't afford that type of teacher, with that high of a degree, to actually teach there.

Mr. SPURRIER. We're having a little bit of trouble hearing you out there.

Senator, could you hear the response?

Senator SIMON. I heard it with some difficulty. But I would also be interested in having a teacher respond.

Mr. SPURRIER. OK. Joy Roberts, are you out there near a phone in Spoon River Valley.

Ms. ROBERTS. Yes, I am.

Mr. SPURRIER. Great. You can respond to Senator Simon's question, then.

Ms. ROBERTS. Well, we only have three boys in our class here, and they are of the upper level, but they seem to be rather interested in it; I think they are getting a lot of good information. Professor Spurrier and Nathalie have really brought out good points in their lectures. The graphics are great. I think they are getting a much better understanding of how government works. They are getting much more, I think, than they do in an actual class here in the high school.

Senator SIMON. OK. Thank you.

The CHAIRMAN. Could I follow up on Senator Simon's question. Would most of you be interested in taking another course in distance learning? Have you found that it has been very satisfactory to you in terms of the educational experience?

I'd ask any of the students to comment.

Mr. THOMAS. I would say a big advantage is simply the speakers—like right now we are on the phone with a Senate committee—you can't get something like that in a class. So the speakers that we have, and the way the program is set up is very good.

But one disadvantage, the major disadvantage, is the fact that we can't stop and have a one-on-one conversation if we really don't understand something, because we just can't stop with all the other schools on the line.

As far as our teacher partner goes, I think I could speak for him in saying that he is learning just as much as we are; this helps him just as much for his classes as it does us. I think that having a professor gets us ready for college and prepares us and lets us know a little bit more what to expect.

So I think it is a very big advantage overall.

Mr. SPURRIER. I think I may have stepped on a question that came out a moment ago. If you could repeat the question from Washington about whether students would be willing to take another course—was that the question?

The CHAIRMAN. Yes. Do they feel from the experience of taking this course that it was sufficiently useful and valuable that they'd be willing to take another course in distance learning, in another subject matter—or do they feel like they've done this, and they want to move on to something else?

Mr. SPURRIER. Let's go out to West Virginia, to Herbert Hoover High School. April Swiney, are you there?

Ms. SWINEY. Yes, sir, I am.

Mr. SPURRIER. Would you be willing to take another course like this?

Ms. SWINEY. Oh, yes. As a matter of fact I'm considering taking Japanese next year.

Mr. SPURRIER. Great. What about some of you here in the studio from Perry; now that you've been through almost an entire semester, would you be willing to go at it again via satellite with a different course?

Mr. LESTER. Definitely. I think I have enjoyed this class enough and learned enough that I wouldn't hesitate to take another one.

Mr. SPURRIER. OK. Nathalie, you might throw that to a couple of other students here and see if we get similar endorsements, or if they tell us this isn't what they want at all.

Ms. GENTRY. OK. Let's go back to Fredericktown, OH. Cara Peterson, are you there?

Ms. PETERSON. Yes, I'm here.

Ms. GENTRY. What do you think about it? Would you take a course like this again?

Ms. PETERSON. Yes, I would take another one. As a matter of fact, I'm taking AP calculus by satellite right now, and chemistry is offered at our school, and two of the students in our class take AP chemistry, and we have no problems with that.

Ms. GENTRY. How about Patrick Gordon in Houston, MS?

Mr. GORDON. This is my second satellite course. In fact, I have already had applied economics, and I enjoyed it, and that's really the reason I took this course is because of my experience with applied economics.

The CHAIRMAN. Could I ask the teachers, Bob and Nathalie, how this experience is different from the ordinary teaching experience, and have you enjoyed it as teachers.

Mr. SPURRIER. Oh, I think we enjoy it very much. I think the overall give and take with the students is frequent, and they are not at all intimidated about calling in to the studio, and they are doing a good job.

Nathalie?

Ms. GENTRY. We keep in frequent contact with our students on a weekly basis. We have quizzes, exams and papers. So just about every week we are getting something in the mail from the students. This makes it easier for us to track their progress, point out the students who may need a little bit more help from their teaching partners.

Our teaching partners for the most part are real good about calling us if there is a problem or if there has been good progress made with a particular student; or if someone has placed well in some sort of contest, we always like to know that so that we can give them the recognition that is due them over the air.

So we have a lot of contact with the teaching partners and a lot of contact with the students. They use the 800 number very frequently, and we are available to them most of the time, and it has been real rewarding.

Mr. SPURRIER. One of the joys of being on live, Senator, as you pointed out earlier, is when you make a mistake, they take some delight in giving us a call and saying, "By the way, do you realize you made a mistake on that?" And about all you can do is fess up

at that point, because they've got you on videotape. [Laughter.] We do appreciate it if we do have some glitch that they give us as call and let us know about it.

Another thing I think that we can't stress too much is the importance of the teaching partners out in the participating schools, as I mentioned a moment ago. They are really a tremendous asset to the program. We find in the context of student performance, the students who are doing the best as a group tend to be the students who have the most enthusiastic teaching partners out in their schools, who are encouraging them and really motivating them to keep up with us at all times.

The CHAIRMAN. Let me ask you how do you give the exams and tests?

Ms. GENTRY. As to the question on the technology, whether it is to our advantage to use the technology or if it gets in the way, for this particular course it works to our advantage because we can stay much more up-to-date and give them current information as opposed to just giving them textbook material which, as you know, once the textbook comes out, a lot of times the material in there is a little outdated. Although this is a good foundation, and we have a really good textbook that we use, we like to give them current examples so they can relate what they learn in the textbook to what is happening today, and this gives them a better overall picture, so I think they learn a lot more effectively that way.

Mr. SPURRIER. Let me give an example of that on the Persian Gulf war. Hostilities broke out on a Wednesday evening, and by Friday's broadcast, the next scheduled broadcast, we were able to go up with a full 45-minute show on the war powers, the power of Congress to declare war, the role of the President as Commander-in-Chief and chief diplomat, and bring something to life. We had originally scheduled the program that day on the structure of Federalism very early in the semester, and with Nathalie's help and Lisa Allen, our producer-director, we scrapped everything, reworked it and come on with graphics and everything. That was something that we were able to do because of the live medium that you can't do with any other sort of material, certainly not the print material.

Another thing that is very important to our course is the Congressional Quarterly Weekly Report. I'm sure those of you in the Senate are familiar with it. We use that as text material for the students, so every week they are getting a new copy for CQ that updates them in written form about what is going on in Washington, and then we make assignments out of it, and they also use it for some of their term papers and so forth.

Nathalie, do you want to follow up on that?

Ms. GENTRY. As you said, we have the CQ material that we use; we also ask them to use the Government manual and the Congressional Director, and that way they have as much current information as possible. We are having them write a couple term papers this semester using this current information, and most of the students I have heard from have learned an awful lot from it.

Mr. SPURRIER. And I think the video that we are able to do, the graphics—you've seen a few this morning, both the straight letter graphics and also some of the videotape things we have—we are

trying to teach a generation that has grown up with MTV, and it is a visually oriented generation, and it is very difficult to do.

When I leave the studio here and go into a regular classroom, even though it is an honors class, at Oklahoma State, I feel as though I've left part of my equipment back at the studio because I cannot do things nearly as easily in a regular classroom to illustrate visually what I'm teaching as I can here on the satellite.

The CHAIRMAN. We have been joined by Senator Thurmond, and just before he questions, I was wondering how you give exams and how they are corrected, and how that is different from what happens in a regular classroom.

Ms. GENTRY. Dr. Spurrier and I come up with the questions for the quizzes and exams and the topics for the papers. We have asked the students to write essays on two or three of the major exams that we've given. We come up with all that material, and we send it to the teaching partners to be duplicated and distributed. Once that has been taken care of, we have them send that back to us in the mail; we grade them and record them, keep track of the grade that they would make here at OSU, send those materials back to the teaching partner, and then the teaching partner has final say over the grade that the student will receive, depending on how their school district does their grading. So we do most of the work on this end, and then we send it back to the teaching partners for the final dispensing of the grades.

Mr. SPURRIER. The pattern is to try to match the college board AP examination in U.S. Government and Politics that many of these students will be taking at the end of the semester, which is a combination of objective, multiple-choice questions and essay questions. So when we send the exam out to the teaching partners, we send along an answer sheet for the objective segment to give almost immediate feedback on that part.

But one of the important things on the AP exam and in a college government course is the ability to express oneself in writing and essay form, so those are sent back here for Nathalie and me to grade, and we usually have about a 24-hour turn-around to get them in the mail and back to the students.

That's the basic format. We are teaching the course at the college level, and as Nathalie said, we will give a grade the student would have learned if he or she were enrolled in a college course here at Oklahoma State, but because this is a high school course for the student's transcript, the teaching partner has discretion to adjust that grade if necessary to fit into the high school grading systems around the country.

The CHAIRMAN. OK. We'll have to move on. We want to thank you again for letting us join the class today and for all your helpful insights and comments. And for those who didn't get a chance to speak, if you want to drop us a note on your reaction to this whole learning experience, we'll make it a part of the record. You can write to us here, to myself or Senator Hatch, in the U.S. Senate, and we'll be glad to mention the Star Schools hearings and will include your comments as part of the record.

We'll switch back to Mr. Vance. Thank you very much.

Mr. VANCE. Thank you, Senator Kennedy.

If I might follow up very quickly on a very important question that I think Senator Simon raised in terms of why do we pick the classes we pick and the specific topics that we deal with. For the most part, of course, it is very easy to identify math and the sciences as areas of high need in this country, and most of the distance learning programs are targeted toward schools that simply are not able to provide those resources—largely on the basis of the size of the schools, they are not able to do it.

In the case of the American Government course and a course such as World Geography such as SERC offers, I think you heard some very good answers. Geography is also a topic that has been identified as one that needs to be dealt with in a more effective way in the United States. So in the SERC model and in some others, we are using a master teacher who is not only teaching the World Geography course but is also modelling that course for certified social studies teachers who are required to be in the class with the students, but may not have the skills to deal with that particular course. So we are also able to teach teachers at the same time we are dealing with the students.

And of course, as some of the students said, using this technology is a wonderful way to bring people such as yourselves into the classroom. Students in Leland, MS had a wonderful opportunity to interact with Senator Kennedy—we seem to be sticking him on our audio-bridge more than some of the rest of you, but we want to get you on as well—and that's an experience they still talk about because they got to talk to him about the breakdown of the Berlin Wall and the changes that are taking place in eastern Europe. Those are experiences they just don't get to have any other way in those particular kinds of classes.

We're going to move on to Lincoln, NE. And Senator Kennedy, I appreciate you moving the distinguished Senator from Nebraska to Oklahoma earlier. Recently when I made a presentation to another group, I promoted a Congressman to a Senator, and I was told that was okay as long as I didn't go the other way. So I'm glad to hear that that can happen on all sides.

We are going to rejoin the Japanese team. They are sitting there now. These are the students who have finished the class with Tim Cook.

I'm going to turn it back over to Senator Kennedy, Tim, to welcome you back to this congressional hearing.

The CHAIRMAN. Good morning to Tim Cook and the Japanese I class. This is Ted Kennedy from the Senate Labor and Human Resources Committee in Washington. Thank you for letting us talk to you for a few moments about distance learning.

As you know, we are in the middle of a hearing on this subject, and we wanted to invite some experts like yourselves to tell us what it is like to take a course by satellite.

I understand we have schools on-line from Iowa, South Carolina, Ohio, Mississippi, Georgia, and Wisconsin as well as those in the studio from Nebraska.

Again, I invite members to feel free to ask Tim and the students questions at this time.

First, would any of the students in the studio from Fremont High School like to make any comments?

Mr. COOK. Let me introduce them. Good morning to all of you. The students here from Fremont High School are: Ken Lowther, Becky Drieling and Melanie Stoltenberg. If you have any questions for them, we'd be more than happy to answer them.

The CHAIRMAN. Tim, what is it like for you to teach Japanese over a satellite network; what are the pros and cons, in your view?

Mr. COOK. Well, the cons are obvious—I can't see the students directly in front of me; I can't get their facial reactions to things, and I can't interact with all of the thousand students that we have on a personal basis every day. But I try to emphasize what I can do by TV, and there are a lot of things I can do that an ordinary classroom teacher couldn't do.

I feel like I can play with reality more than anything; I can show something on TV, and there are all kinds of visual things I can do with pictures and with video. Even really small pictures which won't be very big in a classroom, you can't see them very well, on a TV screen, you can take a small picture and make it as big as the TV screen. So there are a lot of visual things that I can do that I can't do in the classroom.

I think for the students it is fun to be able to interact with the TV. Usually, TV is just one way, and to be able to talk back to the TV is fun for me, and I think it is fun for all of us who are involved.

Let me also introduce the students who are on-line today. We have Thad Murphy from North Fayette High School in West Union, IA; Gwen Williams from Princeton High School in Cincinnati, OH; Shannon Staats from Green Sea Floyds High School, Green Sea, SC; Lisa Hoyer from Dublin High School, Dublin, GA; and Jennifer Franklin from Hernando High School, Hernando, MS.

The CHAIRMAN. Senator Thurmond is here, and I think he had a question or two.

Senator THURMOND. Shannon Staats, I want to say we are very proud of you, and please extend my greetings to all the students at Green Sea High School.

I'd like to ask you what it is like to learn Japanese by satellite.

Ms. STAATS. It has been a very interesting experience interacting with the Japanese facilitators, the teacher, with Tim, and of course, our tutors, and working with people from all over the country. It changes learning a little bit, but I think it helps, too.

Senator THURMOND. Well, congratulations, and many good wishes to you.

Ms. STAATS. Thank you.

The CHAIRMAN. Senator Bob Kerrey.

Senator KERREY. Tim, it is good to see you. Your parents are here watching you on television as well.

Let me just ask you if you'd have said yes if one of the 16,000 school boards in America would have tried to recruit you to come in and teach 5 or 6 periods a day, with 25 students in a period; would you have found yourself agreeing to teach in a traditional classroom?

Mr. COOK. Actually, my experience teaching in a classroom has been mostly in other countries; I haven't spent a whole lot of time in this country in a classroom except as a student. In a way, I envy classroom teachers because they are right there where it is happen-

ing, but I don't think I'd trade this experience for anything in the world. I feel fortunate that I have been able to do a lot of interesting things up to now, but this is the most fun thing I have ever done, and I wake up every morning, thinking, "Gosh, I get to go to work and do this again." [Laughter.]

Senator KERREY. I guess one of the things I was focusing on is that it seems extraordinary to me that you are teaching 1,200 students a day, that you manage to teach such a large number of students. My experience in Elkhorn, NE, where I visited a school where the students were learning, their conclusion was that they learn faster, they learn Japanese better, they learn languages better. All three of the students that I talked to had taken languages, and they said they learned it faster, and they learned it better, and the numbers as I have examined them appear to cause us to conclude that they also learn it cheaper, which is a pretty devastating combination for those of us who are paying for it. [Laughter.]

Mr. COOK. I think the students who are taking this course—we feel like we are a community spread out all over the country—and the students are enthusiastic and want to see it succeed. There are usually some problems during this kind of a course, that they are learning anything by TV, and I think they might be working harder for this course and want to see it succeed.

Senator KERREY. Tim, one follow-up question. I know you work directly with Liz Hoffman, who used to be a public school teacher, and she left to join the Nebraska Department of Education just to put this thing together. She is a very gifted teacher, an award-winning teacher in languages. How important is it to have a gifted teacher like that being directly and actively involved in the development of the curricular program?

Mr. COOK. You couldn't imagine how important it is because there are just zillions of little details that I have forgotten since I was in the classroom, and she'll tell me, Tim, you can't do that because either the students won't understand it, or the facilitator or the classroom teacher won't understand what you're doing. Or she'll say that's wonderful, they'll really groove onto that. She came right of the classroom before she joined us, and she is really an excellent teacher. She has won awards, and she is famous all over the country. I feel so fortunate that she is with us in this program, and I don't know what I'd do without her. She has been my mentor.

Senator KERREY. Thank you, Mr. Chairman.

Mr. VANCE. Tim, part of my job is to take off my classroom teacher hat and wear my television hat, and I'm trying to keep us on time, and we're doing a good job so far.

The Senators I am sure would express their gratitude for your joining us today.

The CHAIRMAN. We certainly do. Thank you very much. This has been enormously helpful and valuable, and we are grateful to all of you for sharing your experience in this distance learning class.

Thank you very, very much.

Mr. COOK. Thank you. It has been fun for us, too.

The CHAIRMAN. Senator Simon.

Senator SIMON. Could I just ask one question. What is the limit—he is teaching 1,200; could he teach 12,000; could he teach 120,000?

Mr. VANCE. The limit that we are dealing with currently, Senator, is that we keep that ratio of tutors that are on the line interactively 2 days a week with the students to approximately one-to-ten or one-to-twelve.

As I mentioned earlier, we are currently expanding that from the 1,200 students that we serve now to 2,400 students for the next year, which is double but still not the number of students that we would like to serve.

What you will see happen with interactive learning in the next few years as we refine the process is getting to take a look at what truly needs to be interactive. You saw some skits in an earlier part of this presentation. Those skits will not always need to be live and interactive, so we'll be able to use the other time that we have technology available to do what we discover truly has to be interactive. We are on the cutting edge of the use of this technology for learning, and as we refine what we know about it, we can expand the number of students.

We will get to 12,000 students, but we are still in the process of finding out how to do that most effectively.

Senator SIMON. Thank you.

The CHAIRMAN. We need to move on. We've got one more live demo, and then Gary will be invited to join our next panel for the questions.

Senator THURMOND. Excuse me, Mr. Chairman. I need to get back to the Judiciary Committee. Could I make just a brief statement?

The CHAIRMAN. We're going live, Strom. I know that you have to go on.

Senator THURMOND. Oh, I see. I'd just ask that my statement be put in the record, and commend Mr. Vance and Mr. Cauthen for the great job they're doing.

Mr. VANCE. Thank you, Senator.

The CHAIRMAN. We'll make sure your statement is put in the record.

[The prepared statement of Senator Thurmond follows:]

PREPARED STATEMENT OF SENATOR THURMOND

Mr. Chairman. It is a pleasure to be here this morning for this live interactive hearing on Star Schools. Seeing Star Schools in action—such as we are doing today—is most worthwhile.

Just a few years ago, it was a privilege for me to support the establishment of Star Schools, which allows students in K through 12 to take courses by way of satellite—which they otherwise would not be able to take. For example, some high school students in rural areas are now able to take courses in Russian I and II, Japanese I and II, Physics, Advanced Placement Economics, Precalculus, and several others. Just a few years ago these same courses were not available, but now through satellite technology many students can participate in these challenging courses.

Mr. Chairman, I want to take this opportunity to commend the work of my good friend Henry Cauthen, the president of the South

Carolina Educational Television Network and also the cochair of SERC, the Satellite Educational Resources Consortium located in Columbia, SC. Henry has been a real leader in the development and implementation of Star Schools, and also in getting SERC up-and-running.

As you know, more than 20 States are a part of the SERC partnership, which provides for-credit courses via satellite to high school students. At the present time, about 5,400 students are enrolled in courses 23 states. I am pleased with the progress that has been evidenced in just a few short years.

Mr. Chairman, I want to also take this opportunity to welcome a fellow South Carolinian to the hearing, Mr. Gary Vance, the executive director of SERC. He has done a fine job in not only administering SERC, but also in attracting financial commitments from State and local education agencies, and corporate and foundation support. This is a partnership at its best, and I wish to commend him for his fine work. It is a pleasure to have him here today to moderate the demonstration and also to present testimony.

In closing, it is again a privilege to be here, and I look forward to reviewing the testimony.

Mr. VANCE. We'll now move on to Spokane, WA, where we'll join a group of middle school students who are involved in a science class. By my calculation, it is 8 in the morning out there—Senator Adams may correct me if I'm wrong, but that's the way I figure it. So let's quickly join them.

The CHAIRMAN. We want to thank you for joining us so early in the morning out there. You are participating in a Senate hearing on the Star Schools program. We are gathering information about distance learning and what it is like for both teachers and students to take a course via satellite.

I understand that you are not usually in the studio, but that you are usually sitting in a classroom and taking the class over the television. Can you tell us a little bit about what it is like and whether you have found it to be a useful educational experience?

Maybe I could ask Debbie Wilson if she would be good enough to respond.

Ms. WILSON. Good morning, Senator.

I'm Debbie Wilson, and I am teaching the middle school science class. We have a combination of students here with us this morning—not all from the middle school science class. We also have two students from our AP English class. Getting people here at this time of the morning was not simple, so we took whoever was closest. The middle school science student did get up at 3:30 and leave this morning, so let's start with them and let them introduce themselves.

We'll start with Tim.

TIM. I'm Tim from Oroville, which is right on the Canadian border, and I'm taking the science class.

MADDIE. I'm Maddie, and I live in Oroville, too, and I'm taking the same science class.

Senator ADAMS. Why don't the two of you tell them how far away Oroville is from Spokane?

MADDIE. It is 5 hours, approximately. [Laughter.]

Senator ADAMS. Just so you can get some idea about how big that State is out there.

TRAVIS. My name is Trav, and I go to Freeman High School, which is 20 miles southeast of Spokane.

CHARMAINE. My name is Charmaine. I also go to Freeman High School, and I take the AP English class.

Ms. WILSON. Thanks, gang. They want to know some details about what it's like for you in the class. Let's start with Maddie and Tim.

Tim, tell us about technology in this class. We've been using technology to do this class. What do you think would be a good way to continue or improve on it?

TIM. Well, the best way it could be improved would be a faster way of conveying written material over the distances. That could be done by FAX or by computer system.

Ms. WILSON. And part of the Star Schools money that we have gotten already and are putting into our network is for computers to share data back and forth over the satellite system and over the phone lines.

Let's talk to Travis and Charmaine a little bit. Travis, let's start with you. What do you think about your English skills this year, and how have they changed as a result of this class?

TRAVIS. Well, basically, I have learned many things that I never even knew about. I have learned how to read analytically and inferential reading, and I have read a couple works of literature that I didn't even know existed; they are really popular pieces of literature, and I had never even heard of them before. So I have broadened my horizons, basically.

Ms. WILSON. Charmaine, can you add anything to that?

CHARMAINE. My essays are a lot more organized, and they stick to one topic a lot better than they did at the beginning of the year.

Ms. WILSON. Do any of you have to add about your peer group out there that you are interacting with on a daily basis through the class? How has that affected you?

CHARMAINE. You can compare what your scores are—for instance, we have a "Shining Star" list, and you can see how well the other schools are doing, and that makes you want to do better, so you try harder. It's a competition thing with the schools.

Senator ADAMS. Deborah, if I might break in a minute—this is Senator Adams. When we started this program, one of the concerns that we were trying to cover was the great distances between the various schools and the fact that teachers could not be available at that particular time. Have you found that you are able to contact your teachers through this system and get information that you need that you would otherwise get from a teacher in the school room? We are trying to spread our teaching staff out to some of the smaller schools.

Trav, I know you have been involved in this, and I know you are an all-league tackle, so I'd like to know your feeling about what kind of communication you are getting from the teacher now.

TRAVIS. Yes, it is very easy to get hold of our teachers. They are just a phone call away. You can talk to them on the program, but if you don't get the chance then, you can just go to a phone and call them here at the office, and usually they have someone here

that you can talk to and get the information that you need from the class or assignments or help with something. After school, you can call in and get help on assignments or just talk with the teacher.

Senator ADAMS. Is the FAX system in yet in your area, where you can get it over the phone lines—maybe I'd better ask Deborah that.

Ms. WILSON. Some of the schools do have FAXes. We have one in the studio, of course. But not all of the schools do have a FAX machine capability. The data transmission system with the computers is not going to be in place until fall; that will help the English students a lot share assignments and let them critique each other's work much more easily than they can do it now. The English teacher is real excited about the ability to do that, and we're really excited in the science class about the ability to share data rapidly and quickly.

Senator ADAMS. Deborah, could you have two of the students comment on Oroville and the relationship of the program there, because I think many people don't understand how scattered and how remote certain parts of the State are, and why we consider this program so valuable.

Do you want to describe your high school a little bit, where it is and what you have received from the STEP program that you were not receiving before in terms of your curriculum?

Ms. WILSON. Maddie, do you want to try that?

MADDIE. Sure. Our high school is pretty small—well, it's not really small, but it does have a really small number of people in it. It is different from the other science classes. I am currently taking physics, and it is like a group thing, and with this, it is all over, and you can learn a lot of stuff, and if other people have questions, you can learn, too. If they call in and talk to Debbie, they might ask questions that you never thought of asking right there, but you did want to know about.

Senator ADAMS. How many are in your school, approximately?

MADDIE. Two hundred.

Senator ADAMS. And what is the nearest town to Oroville?

MADDIE. Tonasket.

Senator ADAMS. OK, now you are getting the point across of what I'm trying to indicate to people, which is that this gives you an up-to-date physics curriculum that you might not otherwise have in that small city.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Have you thought about what courses you might take next year through distance learning, or do you know what courses are going to be available yet?

Ms. WILSON. Well, we are changing our offerings. We are adding more courses. We still have the strong language orientation with Japanese and Spanish and Russian, but we are adding a high school technology class and a high school applied math class. Three of the students are graduating and going on to college, so it will have to be Tim who can address that question.

Tim, have you thought about taking a language over the satellite?

TIM. Yes. Before I am out of high school, I plan on taking a language, and also probably some math courses over satellite.

Senator ADAMS. Tim, what do you think could make this program better for you? What additional tools should we be thinking of—I mentioned the FAX machine, computers, other ways of communicating in addition to this face-to-face contact, which I think is just a gigantic step forward, but I'd like to be sure we are focusing on all the things you need.

The CHAIRMAN. Senator Adams, I apologize to you and to Tim, but we are about to lose the satellite in about 20 seconds.

I want to thank all of you, and maybe you could give a little thought to that and drop Senator Adams a note.

We want to thank all of you for permitting us to enter your classroom and for your very, very useful and helpful comments.

Maybe you could give them the rest of the day off from school, Ms. Wilson. [Laughter.] Thanks an awful lot.

Ms. WILSON. They've got to change classes in a few minutes, and we've got seven other kids ready to play science TV students here, so we're excited about that, too.

The CHAIRMAN. Thanks very much.

That concludes the demonstration portion of our hearing, and I would extend a special thank you to Gary Vance who was an excellent moderator for the demonstration. Your explanations were enormously helpful, and I hope you'll join our next panel at the table, Gary.

I think this experience of seeing this program in the different communities, having the opportunity to participate in classes in Mississippi as well as in my own State, and seeing the dimension across this country from Washington, DC to Washington State, the Midwest, and the vast degree of information that is moving is enormously helpful. And I think what was so impressive was the liveliness of those students. You can see that they are learning and benefitting—and they are excited about it, too. You just can't miss the central points of this experience, and that certainly has been enormously valuable to me in this demonstration.

For all intents and purposes, if any of the members want to make opening statements, this would be the time to do it, or we can put them in the record and move to the first panel.

We have two panels, and we hope members can remain.

Senator KERREY. Mr. Chairman.

The CHAIRMAN. Yes, Senator Kerrey.

Senator KERREY. I do have a longer statement that I want to include in the record, but since I am not on this committee, it might be useful to say that I've spent a lot of time in contact with the Star Schools program in Nebraska, and the question that I directed at Tim was designed to provoke indeed the response that he gave, which was a very enthusiastic statement in support of having a gifted teacher in charge of or connected to the programming aspect.

I have had a lot of experience with telecommunications and the attempt to apply it in school before, and I could bring before the committee, as I am sure you have seen as well, lots of "bombs", lots of them that just don't work. They are very exciting, you look at the video disk, you look at the application and you think gosh, this

is great—but somehow it doesn't work in the classroom. I think the key that unlocks that is having at every stage possible, particularly the programming, where they are constantly adjusting fire on a daily basis, to make certain that that curriculum in fact works for the students.

The second thing that I would urge the committee to consider is that there are 16,000 boards out there that are having to make the decision as well as 110,000 principals who are running the schools themselves, and notwithstanding our language to deregulate those schools, the fact is almost every, single impulse that we have to try to improve them requires them to do additional paperwork to get over just the physical tasks that we have given them. So they find themselves in a board meeting, face-to-face with all kinds of salespeople who are trying to sell them some new technology, and it is extremely difficult to answer the question "What works?" If I've got $10,000 or $20,000 to spend in a relatively small school district, the question of "What works?" becomes a paralyzing question.

So for your committee's use, Mr. Chairman, I would urge you to look for perhaps some way at the local level to assist—in perhaps a laboratory fashion—to assist us in trying to answer how do you make that application work, because those boards are sitting out there in a position much like most of us, that is, that we are at an age where we don't understand the technology at all—I'm sure the chairman does, of course——

The CHAIRMAN. Of course he does. [Laughter.]

Senator KERREY. —but which makes it extremely difficult to make a decision. Those boards need an awful lot of assistance; otherwise they will apply it incorrectly.

The CHAIRMAN. I think that's an excellent comment, I hope maybe we can get from our first panel some suggestions on it because I think the Senator raises the point that there are going to be common questions asked all over the country, and being able to be of some help and assistance in terms of local communities is something that clearly we ought to be addressing.

We thank the Senator from Nebraska from coming. You are welcome any time. We appreciate very much your longstanding interest in the program, and your statement will be included in the record.

Senator KERREY. Thank you, Mr. Chairman.

[The prepared statement of Senator Kerrey follows:]

PREPARED STATEMENT OF SENATOR KERREY

I want to commend the committee for conducting this hearing on the Star Schools program and for including the demonstration of the Japanese language course, which originates in Lincoln, NE, and is distributed through the Satellite Educational Resources Consortium (SERC) to students in 22 States.

The Star Schools program is a success story—the kind of success story which should be expanded and replicated. Students are able to learn subjects for which it is often difficult to find good teachers. Moreover, it appears they learn the subject faster and better than through other available methods. And, for icing on the cake it appears the per pupil cost is less. Faster, better, cheaper is an exciting combination.

Star schools and SERC have been crucial in helping deliver satellite technology to schools. Currently 67 schools in Nebraska have uplinks These uplinks are the basic building blocks in the system. They mean access and participation. Without them, there would be no system.

Before spending time with students and teachers who are using this technology I was skeptical about its merits. My impression was it would be nothing more than the talking heads which bored so many of us into submission in the 1960's and 1970's. Further, having heard so many unfulfilled promises about the potential of high tech teaching devices I thought this would be another disappointment.

After spending time with students and teachers who are using the Star school technology, I am sold on its potential to dramatically improve the performance of America's primary and secondary school students. If we do this one right and if we connect it to the need for more home based learning, i.e., adult education, we could have an even greater success in the making.

Mr. Chairman, this will not be an easy venture. One of the most important keys to making the Japanese language program work is that a gifted classroom teacher is in charge of the program development. It must be said with emphasis that Star school technology is not easy to apply. We cannot just turn on some machines hoping the learning will occur automatically.

In Nebraska, we are fortunate to have a fully developed Educational Television Network which enjoys broad political support. NETV has built a much deserved reputation for programming and progressive thinking about the educational challenges in our communities.

The most immediate challenge is to sustain and expand our support for Star schools. Beyond this we should look for ways to help our schools discover technology applications that work. Every one of America's 110,000 schools is busy morning, noon, and night just trying to accomplish the long list of things Mich the public wants them to accomplish. (Some of the most difficult programs for our schools are those which are "cost free". . . the ones which purport to increase accountability but merely increase the amount of paperwork.)

Every one of America's school boards is deluged with presentations by equipment sales people who offer some new gimmick to make teaching easier. All of them promise a miracle; the dilemma is trying to separate the merely revolting from the truly revolutionary.

I would respectfully suggest the committee look for a mechanism to encourage the development of public-nonprofit centers of applied educational technology. These centers should be looking for useful educational applications for our schools and homes. These applications would include but not be limited to the STAR school approach.

As to funding the current program, I know some people have said that equipment should be a local expense. I know that people have said that many schools have equipment; or that we should now move on with programming and other activities. To some extent, both are true. There are local systems which can finance their own equipment. There are private sources which can and will make contributions. There are other needs in the distance learning area. But, there remain schools that do need help in acquiring equipment. And, if we do not assist them, we are in effect shutting them out of a tremendous technology.

Today, students in the schools with uplinks not only have access, they have access to courses of study which have been developed especially for them. Nebraska is what is known as a producing State, i.e., it develops and disseminates courses for use in secondary schools. The Japanese language program which you will see today is our current contribution to this effort. And, we have another course offering—in environmental science—in preparation. Our students also benefit from the programming which is produced in other States.

Production is both time-consuming and expensive. And, despite the success of the Japanese language course and several others, such as those produced in Kentucky, this is a very new field. I have, in fact, had people in the education field tell me that good programs are 4 to 5 years down the road. While I know the success stories, I also know that an expansion of these success stories will, indeed, take time and resources. The Star school program can help provide those resources and help us get a start on the work which goes into them.

The Nebraska success has not been a solo success. Much of our success has been intertwined with the Satellite Educational Resources Consortium (SERC), which includes 23 States. We share programs, information, teachers and students. What might not be justified for a single State becomes feasible because we work together. It is the kind of effort which does indeed contribute to greater educational opportunities throughout the country.

I have been in the educational television studios in Lincoln—where the Japanese language program originates. I have been in the classrooms in Omaha where students are practicing their Japanese. I attended the technology fair held here in the

Senate in early March where students from other States spoke of the opportunities which had been available to them as a result of this program.

Competitions and evaluations indicate the strength of this program. SERC Japanese language students took top prizes in a competition in Georgia. An evaluation undertaken in Nebraska showed that Japanese language students performed at least comparably with those in traditional classrooms and significantly higher in certain areas.

The Star school program has made technology available to teachers and administrators and students who would not otherwise have had such access. These efforts demonstrate that we can assist students in accessing resources that open up a new world to them regardless of where they happen to be located. This is especially important to students in rural America.

By most measures Star schools is a young program, but it has already had widespread impact, and its potential is vast.

I would urge you to extend the Star Schools Program. I believe both equipment purchases and programming efforts should be eligible activities and I believe that current and past grantees should be allowed to apply for additional funds. I would like to explore with you further the educational technology center concept.

Mr. Chairman and members of the committee, I want to thank you for the opportunity to address you on this important program.

The CHAIRMAN. We are pleased to have with us the first panel on "New Directions". Nancy Carson is from the Office of Technology Assessment in Washington, and she will be accompanied by Kathleen Fulton, an analyst with the Office of Technology Assessment. Also on our first panel, Inabeth Miller, executive director of the Massachusetts Corporation for Educational Telecommunications in Cambridge, MA.

We'll also ask Gary Vance, who served as moderator for the Star Schools demonstration, to join the panel for questions.

We welcome you all. Your testimony is greatly appreciated, and we thank you all very much.

We'll start off with Nancy Carson. Good morning.

**STATEMENT OF NANCY CARSON, OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, DC, ACCOMPANIED BY KATHLEEN FULTON, ANALYST, OTA; AND INABETH MILLER, EXECUTIVE DIRECTOR, MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS, CAMBRIDGE, MA**

Ms. CARSON. Good morning, Senator. It is a pleasure to be here.

Our remarks this morning will reflect work that was done at the request of this committee in a report called "Linking for Learning." It was fun to do this report. You've seen the excitement this morning of the classes. We learned an enormous amount from doing this, were able to put it together, and the report itself is now closing on 10,000 copies distributed worldwide, so we're glad the committee asked, and we hope our remarks can be helpful.

In the interest of time, I'd like to briefly summarize the conclusions so that we can move on and answer questions.

Five years ago, few States had distance learning projects or plans or any knowledge of distance education and what it could bring. Today, every State and many districts have projects which are up and running.

It is important to keep in mind that these projects are evolving and changing as we have new objectives for education and as we learn to combine technologies in new ways, and as many partners come forward to participate in supplying information, hardware, and resources for schools.

The principal application of distance learning in K through 12 education has been providing high school courses in advanced subjects, especially where such courses are not available because of too few students or a lack of qualified teachers—and this is a lot of what we saw in the interesting feeds this morning. But an increasing number of efforts go beyond courses and offer modules and enrichment activities for classroom instruction, electronic field trips, and visits with distant scholars, scientists and heroes. One of the most valuable applications, and something we sometimes forget, has been for staff development and in the in-service training of teachers and administrators.

The systems, as I said, are increasingly becoming hybrid systems; as the electronic technologies are so versatile and capable of being flexibly linked together in new ways, every system we see will be different.

OTA found that in most instances, distance learning is as effective as face-to-face instruction. Most of the hard data that exists on distance learning comes from the workplace or adult learning environment, but we do see some evaluations being conducted in schools; we look to the outcomes of the Star Schools first-round research, and by and large we think it works given some effort to make it work.

One of these efforts is to remember that to have the technology meet its full potential, teachers need to be trained and supported. They need to be comfortable with the technology, the technology needs to work, there need to be good resources, good programming. The programming is the thing that comes through; the hardware just brings it to us. So we want to keep in mind that it is as least as powerful for what it can do for teaching as for learning.

I will summarize some particular conclusions we came to on the Star Schools programs since that is your particular focus this morning.

One of the primary goals of the Star Schools legislation, which was to create multiState and multiorganizational partnerships, has been realized. We feel strongly that much of the strength of the programs comes from these collaborations. It is very important to cross boundaries in education, and as you know, it is hard to do; boundaries present problems for teachers and administrators. These programs force the crossing of boundaries and bring new ideas.

The first round of Star Schools awards increased the access particularly of rural and isolated schools to distance education. We estimated that at the conclusion of the first round, 30 percent of rural and isolated high schools would be linked by a dish, and of that number about one-third would have been funded by Star Schools.

The firm numbers are not in, but we still think this is on target.

A lot of useful information has come from these projects as Senator Kerrey mentioned; we are learning more about what works. That information presents some data that now can be shared and built upon.

Particularly Star Schools as a program has moved distance learning from the realm of science fiction into reality and given us some real experience in what we can do, and I think we will look

back on this as the starting point when we begin nationally to really look at what technology can do for education and put things together.

Finally, the committee asked us if we might suggest some things to keep in mind in looking at the legislation and looking ahead at new direction.

The original emphasis on mathematics, science and foreign language was certainly understandable and is very important in terms of educational needs. But increasingly these needs are starting to be met through these programs and the Department of Education and National Science Foundation support, and it may be time to look a little more broadly, look at new kinds of needs. There is lots of interest now in schools in what we call critical thinking, higher order thinking skills. This lends itself well to electronic field trips, bringing in resources, new kinds of interactive learning and exercises in the classroom. And critical is thinking that exists over and above the subject, so the original emphasis on math and science, while certainly understandable, might be something that you would want to consider broadening.

We would also suggest you might want to consider the nonschool learner. This might include homebound and disabled students, and as you know, we have many youngsters in detention centers and prisons. Interesting things are going on in institutions with technology for learning, and this might be something that you would want to consider.

We also suggest you keep in mind that we probably do need some better mechanisms to disseminate what we are learning in these programs, particularly for teachers in States or regions to share their experience on a very practical basis.

In conclusion, I'd like to say that it is vital that the Star Schools program stay as dynamic and open and focused on results as the programs we have seen in action this morning.

I'd like to put my full statement in the record and answer questions whenever you wish.

The CHAIRMAN. Thank you very much.

[The prepared statement of Ms. Carson follows:]

PREPARED STATEMENT OF MS. NANCY CARSON

Mr. Chairman, we are pleased to have the opportunity to provide testimony for this hearing on the oversight and reauthorization of the Star Schools Assistance Program. Our comments today draw on OTA's assessment of distance learning, which was requested by this committee. OTA's report, *Linking for Learning: A New Course for Education*[1] has received wide attention in Congress, in Federal agencies, and at the State and local level. The accompanying video report has been used by hundreds of educators seeking guidance on innovative telecommunications applications for education.

Our testimony is in two parts. The first provides a broad overview of distance learning in today's classrooms. The second section discusses the impacts of the Star Schools Program and suggests new directions for the future as you consider reauthorization.

*Distance Education in Today's Classrooms*

Today we joined a government class taught in Oklahoma. All across the country there are classes similar to this, electronically linking students and teachers as far

[1] U.S. Congress, Office of Technology Assessment, *Linking for Learning: A New Course for Education* (Washington DC: U.S. Government Printing Office, November 1989).

as a continent away, across the continent, or as close as across town. Students may be working on a common science experiment with hundreds of sites across the country, or speaking Russian with a teacher in another State. Others may be reading a formula on the chalkboard in a classroom on the other side of town, or discussing poetry with a Pulitzer Prize winning author in London. These are examples of what is commonly known as distance learning: using live, two-way interactions to link teachers and students at different locations.

Distance learning in today's classrooms is diverse and growing. Five years ago few States or districts had projects, plans, or even knowledge of distance education at the K-12 level; today every State and many districts have projects up and running. The reason is twofold: important educational needs can be met with this technology, and the technology itself is becoming more accessible and less costly.

The Star Schools Program, other Federal programs, statewide initiatives, local efforts, and projects supported by the telecommunications industry have all contributed to this growth. Today's distance learning involves many players and new relationships. Connecticut's distance learning efforts have involved a partnership between the schools, the State education agency, and the telephone company. In Cedar Rapids, Iowa, the Kirkwood Community College offered its and expertise to the local district. The local telephone cooperatives in the Oklahoma Panhandle worked with four school districts to develop a state-of-the-art fiber optic television network. And in a unique partnership involving museums, schools, a research laboratory, private industry, and the Federal Government, students joined Dr. Robert Ballard, the prominent marine geologist and discoverer of the Titanic, as he conducted undersea research last year on the floor of the Mediterranean Sea and in the Great Lakes.

The principal application of distance learning in K-12 education has been providing high school courses in advanced subjects, especially where such courses are not available because of too few students or a lack of qualified teachers. For these students, distance learning is the only way that they can study advanced Russian or Spanish, calculus or astronomy, art history or philosophy, psychology or economics, electronics or advanced placement courses (see table 1). An increasing number of efforts, however, go beyond courses and offer modules and enrichment activities for classroom instruction, electronic field trips and visits with distant scholars, scientists, and heroes. One of the most valuable applications has been for staff development and inservice training for teachers and administrators.

Advances in information and telecommunications technology have made possible these rapidly expanding learning opportunities and access to educational resources outside the four walls of the classroom. Some of these technologies, like cable and educational television, Instructional Television Fixed Service (ITFS), and microwave broadcasts, have been around for years. Others, like fiber optics and satellite, are newer. But whatever form of technology is utilized, recent developments have resulted in systems that are powerful, flexible, and increasingly affordable. Most distance learning systems are hybrids, combining several technologies to provide increased flexibility to meet local needs. Maine's telecommunications network, for example, operates with a hybrid of microwave, ITFS, and fiber optic transmission linkages. There is no one best technology for all applications (see table 2).

In most instances, distance learning appears to be as effective as instruction in the classroom. While not as extensive as the evaluation of distance learning in industry, the military, and higher education, research to date conducted by Star Schools projects and others has provided much useful information on K-12 applications. To be effective on these systems, teachers must have training, time for preparation, and institutional support. Students report that they must work harder in courses offered at a distance but they welcome the increased course options, responsibility for their own learning, and the opportunity to expand their community. Whether distance learning works well for all students is yet to be determined, and more research is needed.

Much attention has focused on the power of technology to improve student learning in today's classrooms. At least equally powerful and promising is the potential for technology to improve teaching. The system that brings resources to students brings resources to their teachers. Distance learning not only provides tools for teaching, but also a means to train, support, assist, motivate, and connect teachers in the classroom. As in the program in Hartford, CT, teachers can team teach with colleagues across town or across the country. They can discuss problems and share ideas over an electronic network like Montana's Big Sky Telegraph, which links all of the one room schools in the State with one another and with Western Montana University. Teachers can observe master teachers in action, participate in professional meetings and courses, earn advanced degrees—all without leaving their home school.

We have seen a few exciting examples of using these resources to reach out to those with special needs. For example, in the Pennsylvania Telelearning Project, audiographics technology linked a student too sick to attend school with his classmates and teachers. In this same project, the technology allows students in a correctional institution to take calculus from the local high school, electronically allowing them to work alongside the town kids. Some systems are beginning to reach the home, through homework hot lines and special activities for parents. OTA's current work is examining how distance learning and other technologies can reach functionally illiterate adults and those with limited English proficiency.[2]

Despite the explosive growth of distance learning in K-12 education, access to these resources varies nationwide. The majority of teachers and students have yet to realize the benefits that distance learning can provide.

*Impacts of the Star Schools Assistance Program*

The number of students with access to distance learning in grades K-12 has increased dramatically over the past 5 years, due in large part to the Star Schools Program. OTA estimated that in the first round of Star Schools funding, some 9,000 students were able to take courses via satellite, and another 18,000 participated in science and math projects via electronic network (see table 3). Recent data from the Department of Education suggests that, in the second round of awards, an additional 11,000 students will have access to distance learning resources (see table 4). Star Schools Programs will have reached students in schools in every State.

However, the impact of Star Schools can be measured in other ways.

- One of the primary goals of the Star Schools legislation—to create multistate, multiorganizational partnerships in education—has been realized. OTA suggests that the real strength of these programs has come from these collaborations, producing a rich network of expertise and ideas, collaboration between the public and private sector, and mechanisms for cost-sharing. Because of the 25 percent matching requirement built into each Star Schools grant, and the amount over and above this contributed by States and others, the original $33.5 million in Federal funds for Star Schools in the first round of awards leveraged a substantial capital investment in education.
- The first round of Star Schools awards increased access of rural and isolated schools to distance education. In OTA's 1989 report, we estimated that 30 percent of rural and isolated high schools would have a satellite dish by the end of 1990; of that number, approximately one-third were expected to be purchased and installed using Star Schools money.
- Evaluation from the first round projects has provided valuable information. The projects have begun to provide a record of "what works" in distance learning. They demonstrated that students could learn as effectively as those in traditional classrooms. The projects experimented with ways to increase student/teacher interaction, to encourage group learning, and to train teachers.
- Beyond the direct impact of the Star Schools grants, the program itself brought distance learning out of the realm of science fiction and into reality in the minds of the public and educators. The Federal money stimulated a majority of States and/or districts in States to consider distance education instruction as a means of meeting their special needs. The program captured the attention of the education community, helped them focus on real needs, and encouraged investment well beyond the resources of the Federal program. Several projects that did not receive Federal grants went forward under the support of the partnerships that created them. And, after the first round of funding, some States moved ahead to implement programs initiated by Star Schools, seeking funds from other sources.

*Looking to the Future*

While benefits resulted from the Star Schools requirements for multi-State awards, this provision did affect technology applications and size of projects. In both the first and the second round of funding, three of the four selected projects were satellite applications. Because of the emphasis on multi-State efforts, some very interesting statewide or local innovations were not funded. In the future, it will be critical that Star Schools Program requirements are flexible enough to take advantage of advancing technologies on all fronts.

Increasingly, systems will become hybrids. As technologies of telecommunications and information processing become increasingly integrated, legislation should allow

[2] The study on Technologies for Literacy was requested by the House Committee on Education and Labor and the Senate Committee on Labor and Human Resources.

users to choose and combine technologies in ways that best suit their needs. This would include more experimentation with computer and telecommunications technologies in the classroom. In addition, the reauthorization might set aside a small amount of funding for projects within States, especially to encourage demonstrations of new approaches.

The emphasis on mathematics, science, and foreign language has provided a variety of needed programs. However, there is now considerable support for these subjects in other programs of the Department of Education and the National Science Foundation. It may be time to encourage development in other areas of critical need as well. For example, many schools have a great need for resources to help students with limited English proficiency. Others are seeking ways to help students develop critical thinking skills in cross-disciplinary courses. Teachers are experimenting with new methods of measuring student learning via performance assessment. In these and other examples, Star Schools could make a major impact across the curriculum.

We believe that it would be valuable to encourage projects that target nonschool learner populations, including homebound and disabled students, and youngsters in detention centers and prisons. Systems that serve schools could extend their reach to the community; parent education, adult education, and other activities could be expanded. These applications extend the use of resources to after school hours and help assure long-term support of efforts once the Federal program has ended.

Congress may wish to consider ways to leverage the investment in Star Schools projects by making it possible for awardees to receive support beyond 2 years of funding, in return for additional local commitment and development of services to new clients.

Dissemination activities, coupled with research that evaluates ongoing projects (particularly those that reach new groups of students and offer new areas for study), can further delineate benefits, costs, and impacts on students, teachers, and institutions. Research can help us understand the social and cognitive factors that affect the learning process. There are many questions to be explored: How much interactivity is essential for learning? How can "distant" teaching be extended and supplemented by classroom activities? How do computers, interactive video, and fax machines provide tools for learning? How can this technology be harnessed to best serve the needs of American education?

Finally, our recommendation is that the Star Schools Assistance Program be dynamic, openended, and focused on results. Encouraging responsiveness to advancing technologies, centering on educational needs, and encouraging the expansion of services and objectives are all to be desired.

Table 1

**Whole Courses Offered in the United States in 1988-89 by Selected Distance Learning Projects[a]**

| Foreign languages (119)[b] | Mathematics and science (110) | Humanities (69) | Political science and history (19) | Business and economics (16) | Vocational education (9) | Social studies (8) |
|---|---|---|---|---|---|---|
| Spanish (38) | Calculus (17) | English (28) | History (11) | Accounting (8) | Shorthand (7) | Social studies (4) |
| French (26) | Mathematics (12) | Art/art history (7) | Law (5) | Economics (7) | Electronics (1) | Geography (2) |
| German (26) | Psychology/ sociology (12) | Composition (7) | Government/ politics (3) | Sales/marketing (1) | Home economics (1) | American studies (1) |
| Latin (12) | Science (11) | Literature (7) | | | | Chinese culture (1) |
| Japanese (5) | Physics (9) | Communications (4) | | | | |
| Greek (4) | Computers (6) | Humanities (4) | | | | |
| Russian (4) | Trigonometry (6) | Education (3) | | | | |
| Chinese (3) | Algebra (5) | Journalism/media (3) | | | | |
| Italian (1) | Astronomy (4) | Theater arts (3) | | | | |
| | Pre-calculus (4) | Music (2) | | | | |
| | Statistics (4) | Philosophy (1) | | | | |
| | Chemistry (3) | | | | | |
| | Health (3) | | | | | |
| | Technology (3) | | | | | |
| | Geology (2) | | | | | |
| | Anatomy (1) | | | | | |
| | Biology (1) | | | | | |
| | Biomedics (1) | | | | | |
| | Anthropology (1) | | | | | |
| | Elementary analysis (1) | | | | | |
| | Entomology (1) | | | | | |
| | Fish and wildlife (1) | | | | | |
| | Marine science (1) | | | | | |
| | Physical science (1) | | | | | |

[a] This table represents the total number of courses offered in the subject listed in the distance learning projects in Appendix A. Note that these classes are not of equal size, each class could have from 12 to 1,200 students in it.

[b] Numbers that appear in parenthesis represent the total number of courses offered under a general subject heading.

SOURCE: Office of Technology Assessment, 1989

Table 2

**Transmission Technologies for Learning at a Distance**

| Technology[a] | Configuration | Advantages | Disadvantages | Trends |
|---|---|---|---|---|
| Terrestrial broadcast | One-way broadcast of audio, video, and possibly data; possible audio return | No special receiving equipment or converters; reaches most schools and homes | Limited channels and air time; reception limited by geography; high transmission equipment and production costs | Increased use of data/text transmission |
| Fiber optic | Two-way audio, data, and video | High capacity/speed; channel capacity easily expandable; high quality signal | High installation cost; rights-of-way may be required to lay new cable | Costs are declining rapidly; fiber deployment is expanding rapidly |
| Microwave | Two-way point-to-point audio, data, and video | Low-cost transmission time; no rights-of-way needed | Must be FCC licensed; tower space or location may be difficult to get; difficult and costly to expand channels; crowded frequencies; line of sight required | Use of higher frequencies is expanding |
| Instructional Television Fixed Service (ITFS) | One-way broadcast or point-to-point audio, data, and video; possibility of audio return | Low cost delivery of video | Crowded frequencies, especially in cities; FCC licensing required; limited transmission range; line of sight required | Digitalization may triple channel capacity; wider coverage areas using repeaters; rebroadcast of satellite-delivered programming |
| Public Switched Telephone Network (PSTN) | Two-way voice; limited data and video | Wide coverage; low initial cost; high quality and capacity of fiber optic links; others handle repair and upgrades | Quality is spotty; limited transmission of data and video; cost is distance-sensitive | Expanding fiber installation; digitization of network increasing; increasing intelligence in the network |
| Satellite | One-way broadcast of voice, data, and video; possibility of audio and data return | Wide coverage transmission cost is distance insensitive | Expensive uplinks; high transmission costs; FCC licensing of uplinks; receive site microwave interference (C-band) or rain fade (Ku-band) | More use of Ku-band; possible transponder shortage; increased use of data; increased interactive capabilities |
| Audiographics | Two-way computer conferencing with audio interaction | Low cost; easy exchange of graphics; uses PSTN | Visual interaction limited to graphics/still video | More powerful computers; better software and peripherals increase capabilities |
| Cable television systems | One-way broadcast or two-way point-to-point audio, data, and video | Wide availability; low delivery costs | Limited capacity; can be difficult to interconnect; not usually designed for interactivity | Capacity increases using fiber; more addressability and two-way capability |

[a]Technology systems do not have to operate independently, they are often combined in "hybrid" systems.

SOURCE: Office of Technology Assessment, 1989.

Table 3

**Basic Facts and Figures for the Star Schools Projects**

| Name | Organizational partners | Primary technology used | Grant amounts FY 1989/ FY 1990 | Number of States involved | Number of schools | Number of students |
|---|---|---|---|---|---|---|
| Satellite Educational Resources Consortium | 19 States, each represented by the State education agency and the State educational television authority: AL, AR, FL, GA, IA, KY, LA, MS, NE, NJ, NC, ND, OH, PA, SC, TX, VA, WV, and WI, and 4 cities (associate members): Cleveland, Detroit, Kansas City, and New York | Satellite-based transmission; one-way video, two-way audio; C/Ku-band satellite dishes, steerable, unscrambled signal | $5.6 million/ $4.10 million | 23[a] | 312[b] | 3,300 (est.) |
| TI IN United Star Network (TI IN USN) | 3 State education agencies: NC, TX, and IL; 4 universities: Western Illinois, Alabama Tuscaloosa, Mississippi State, California State Chico, the Region 20 Educational Service Center (Texas); and TI IN, Inc. | Satellite-based transmission; one-way video, two-way audio; Ku-band satellite dishes, mostly fixed, some steerable, scrambled signal | $5.6 million/ $4.13 million | 10[c] | 328[d] | 3,200[e] |
| The Midlands Consortium | 5 universities: Alabama Birmingham, Kansas, Kansas State, Oklahoma, Mississippi, and the Missouri School Boards Association | Satellite-based transmission; one-way video, two-way audio; C/Ku-band satellite dishes, steerable; unscrambled signal | $5.5 million/ $4.14 million | 5 | 278[d] | 2,500[e] |
| Technical Education Research Centers | Boston Museum of Science; the Northwest Regional Lab; Minnesota Educational Computing Consortium, City College of New York, Biological Sciences Curriculum Study; and 5 universities: Tufts, Virginia, Michigan, Pepperdine, and Arizona State | Computers connected via commercial computer network | $2.4 million/ $2.04 million | 18[f] | 447[g] | 18,000 |

[a]19 States, plus school districts from the 4 cities involved as associate members.
[b]Schools participating through fiscal year 1989 funds only. An additional 121 schools are receiving teacher inservice and student seminars only.
[c]The number of States with 4 or more sites. There are 12 other States where TI IN USN has 1-3 schools. Most of these schools are Bureau of Indian Affairs (BIA) schools whose TI IN USN activities are being coordinated through BIA.
[d]Schools that are or will be participating through fiscal year 1989 and fiscal year 1990 funds.
[e]In addition to these students, other students at non-Star Schools sites will take classes developed with Star Schools money.
[f]The number of States with 4 or more sites.
[g]Schools participating in school year 1989-90 only.

SOURCE: Office of Technology Assessment, 1989, based on information provided by the Star Schools projects and the U.S. Department of Education.



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**Table 4--Second Round of Star Schools Projects**

| Name | Organizational partners | Primary technology used | Grant amounts FY 1990/FY 1991 (in millions) | Number of States involved | Number of schools | Number of students |
|---|---|---|---|---|---|---|
| Massachusetts Corporation for Educational Telecommunications | 21 partners in 7 States. Partners are the CT, MA, RI, NH Departments of Education; the Archdiocese of Boston; Lesley College; WGBH Education Foundation; Digital Equipment Corp; Digital Techniques Inc; Tom Snyder Productions; Interactive Video Science Consortium; Sears/IBM Prodigy Services Company; museums; teacher centers; and research centers. | Project uses a mixture of delivery systems: one-way video and two-way audio, computer networks, cable, and a family science kit delivered through the mail. | $4.9/$4.9 (est.) | 7 States plus DC | 60 middle school sites | 3,600 (est.) |
| Pacific Northwest Educational Telecommunications Partnership | 6 partners in 5 States. The partners are the State education offices of Alaska, Idaho, Montana, Oregon, Washington, and Educational Service District 101 (ESD-101) in Spokane. Contributors are RXLCommunications and Apple Computer. ESD-101 has a relationship with AT&T Pacific Northwest Business Communications Services for voice/data communications. | Satellite-based transmission; one-way video, two-way audio; interactive data transmission, and automated telephone system. | $5.05/$5.05 (est.) | 5 States | 256 (est.) | 1,792 (est.) |
| Telecommunications Education for Advances in Mathematics and Science Education | 5 partners in 3 States and the District of Columbia serve inner-city needs: Los Angeles Unified; Los Angeles County; Detroit; Boston; and Washington, DC school districts. | Satellite-based transmission; one-way video, two-way audio; C/Ku-band satellite dishes, steerable; unscrambled signal; computer connected via Internet Computer Network. | $3.45/$3.45 (est.) | 3 States plus DC | 59 | 1,770 |
| Central Education Telecommunications Consortium (Black College Satellite Network) | 12 States: AL, DE, FL, GA, LA, MD, MS, NC, OK, PA, TX, VA, as well as DC and the VI. Project is a partnership of the historically Black colleges and the Black College Satellite Network, whose focus is to provide minorities with role models for students exploring careers in science and math. | Satellite-based transmission; one-way video, two-way audio; C/Ku-band satellite dishes, steerable; unscrambled signal. | $1.4/$1.4 (est.) | 12 States plus DC and VI | 88 (est.) | 4,000 (est.) |

SOURCE: U.S. Department of Education, April 1991.

The CHAIRMAN. Dr. Miller, we are happy to have you.

Ms. MILLER. Thank you, Senator.

I am Inabeth Miller, the executive director of MCET, an organization which in the last year has created the Mass LearnPike, a satellite network; the Mass Learn-Net, a computer network; and has been the recipient of Star Schools for a research project in middle school science and education for seven States in the Northeast that tests the assumption that we can change the way science is learned and taught; we can change it by using multiple technologies, we can change it by involving the total community, we can change it by using things that are already available, others than can be modified, and creating new what has to be created, and finally, knowing the cantankerous northeastern part of the United States and how we prize local autonomy and local control, that each and every one of our northeast Star Schools can choose for themselves what parts of the program they want and how they will change science.

I want to tell you a few stories about us because I think that's what you want to hear, some of the calls that I get every day. It's the morning after the war has started: "Inabeth, what are you going to do about the war?"

"What do you want me to do?"

"We need a program for principals and guidance counselors to help us work with the kids and answer their questions."

Friday morning, there was a psychologist talking to 120 principals and guidance counselors. The following week, three academic faculty in military affairs, history of the Middle East and diplomacy, from MIT and Tufts answered questions from 2,000 students who were desperately interested in what was going on in their world.

"Vladmir, how could you create a space shuttle without asking us in the United States first?"

"The laws of physics are the same for all the world. We use physics, and you use laws of physics, and sometimes we have similarities in our space designs."

The kids yesterday in Chelsea who asked a question on Tour de France that none of 40 high schools can answer felt on that day, at that moment, Chelsea High School was the best high school in the State of Massachusetts.

When the teachers in Provincetown saw on the screen their solution to a problem in a staff development project on inquiry math, began to yell, "Yea, Provincetown."

"Are there cows in Dalton?"

"Where is Stoneham?"

"Are you really having a sequence of programs where kids around the State can testify before the legislature about a real bill that is about to be passed that will affect them, with legislators in every classroom?"

Yesterday, 300 children were dancing and singing in 9 schools. We felt like we had punched a hole in that television set and reached a hand through to the other side.

You know, I've never even met the teachers in the next school, and today I feel like I'm part of a community.

We are inventing a new kind of television, nothing like what you know and see. It involves talking on both ends the way you do, but it involves doing. We distribute mealworms and lava and fabric and computers, and they are all used as kids do stuff at each downlink site.

The first wave of Star Schools, as has been said before, brought distance learning to remote areas, to AP kids. The second wave of Star Schools, what we're doing in STEP and teams in Los Angeles are doing, is bringing things to ordinary kids, to whole classrooms where the teacher is there, to parents, to families, to school boards—all of that is happening right now. It is volume one of everything we are trying, and we are reaching them.

What is the third wave of Star Schools? What do I want you to do and this new legislation to require to happen?

The third wave of Star Schools should bring together whole communities, should talk to intergenerational learning in hospitals and prisons and night schools and libraries. A 6-year-old can learn with a 60-year-old.

It is time we began to learn as a community together in all of those places, in churches and in synagogues. We have to learn how to read. Before we can do math or science or any of the fundamental skills which come next, we need to be a literate society, and then we can branch out—we can do sequences and programs in drug and alcohol rehabilitation, in vocational skills; we can do programs in how people should participate in the Government process. All this should be in the next wave of Star Schools.

Second, we've got to use resources. I mean the community colleges and the colleges and universities and Government and cultural institutions and medical institutions, all of them, and particularly corporations.

Third, we need access to new technologies, not just what we've seen today, but what we want to see tomorrow, what is already being tested in corporations and industry and the Defense Department, around this country. We need access to that if we are going to prepare students to enter those areas and those arenas.

We need to build on strengths. Please don't use Star Schools to reinvent, but let the new Star Schools use each other's resources, all of those resources, to prove even farther, to bring new courses, new kinds of things. We are not going to give courses in Massachusetts in Japanese or physics when there are wonderful things out there, but we are developing courses in mapping the human genome, in order and chaos from MIT, in neurosciences for ordinary 9th-graders from the director of Massachusetts General Hospital and staff from Harvard Medical School.

This is where we stretch today's curricula to answer tomorrow's needs.

Finally, you in Star Schools have given birth to many programs—200 hours from MCET alone, plus video disk, plus computer programs. Give us the resources to share these things, to distribute them around the country, to give information. My schools would have watched "Never Forget" last week, the wonderful program that was done by Fairfax County with Leonard Nimoy about the Holocaust survivors—but we didn't get the information until that morning.

We need to market, to distribute, to have information about what is out there in order to use it. Star Schools has been the catalyst for a dramatic change in education—new delivery systems, new courses, the beginning of an educational community. Tomorrow, give us the tools to stretch that community, to build a greater community, and then we can come together to exchange resources as a nation and indeed as a world.

Thank you.

The CHAIRMAN. Thank you very much, Dr. Miller.

[The prepared statement of Dr. Miller follows:]

PREPARED STATEMENT OF INABETH MILLER

*About MCET and Star Schools*

On March 1, 1990, the Massachusetts Corporation for Educational Telecommunications [MCET] created the Mass LearnPike, a satellite network to serve the K-12 educational community. Because of the large-scale availability of cable in the Commonwealth, a single satellite dish in a city or town often serves all schools, and, with an educational channel and connection to the cable studio, all the residents of that community. With an appropriation of $2.6 million from the Massachusetts legislature, over 100 satellite dishes have brought live programs and services to 1,200 schools, 17,000 educators, and more than 500,000 children in less than one year. Over 150 hours of live, interactive programming have been presented in every subject area, with particular emphasis on science and mathematics. Next year's schedule calls for 900 hours of original broadcasting, 6 hours each school day and doubling of this year's numbers of students and teachers. In September 1990, we were granted a Star Schools award. This has enabled us to extend our resources to seven northeastern States in the form of research, implementation, and documentation of improvement in the science curriculum. This award allows us to use multiple technologies with entire communities and allow individual schools to make curriculum choices that fit their particular needs.

MCET, in designing the Mass LearnPike, is inventing a new kind of television, unfamiliar to those who have not been involved in a variety of our program offerings. The LearnPike is unlike both broadcast and cable in that its primary characteristic is active engagement with the studio as seen on the screen, with the other students in each downlink classroom, and with the whole community of participants. There is not yet a vocabulary to describe the intensity of emotion in the school group when one child from a particular school is asked or initiates a question. (Chelsea, MA, students felt that their's was the best school in the State when no one from 40 high schools could answer a question they posed in French. Their class included 6 Caucasians, 8 Asians, 4 Portuguese, 3 Blacks. Teachers from Provincetown could not contain their elation as a solution they called in was put on the screen by character generator for all others to see.) At the same time, there is an observable normalcy of classroom life, despite the presence of the monitor, when the class is in the midst of meaningful activity. The students talk to one another and the teacher acts as helper, while someone picks up the phone to ask or answer a question of someone in our studio.

Although programs may be taped for later use, our broadcasts all build on live interaction. The Mass LearnNet (computer network), begun in March 1991, extends an experience beyond the classroom confines, to deepen the content and provide an opportunity for questions unasked or unanswered on the broadcasts. Both in research and practice, we are examining the nature of interactivity: What happens when engagement takes place? What are the short- and long-term effects of learning with these new modalities? While programs are on the air, our staff is in classrooms, observing and video taping student and teacher responses. Teachers also send us their reactions to individual programs via the computer network.

While other networks concentrate on low-enrollment courses for highly motivated students in remote settings, MCET has chosen as its primary focus short program series in both fundamental and enrichment areas for whole classes with the teacher present. All students need to do things not just watch. One more hour of television in the lives of "video inundated" children is a waste of time, not a learning experience. We seek to break through the passive screen by incorporating multiple technologies and a range of media to challenge each participant. We design classroom materials to accompany each program series. There are no observers, only active learners.

Because we benefit from U.S. Department of Education Star Schools funding, we have a concentration of science and mathematics offerings, particularly for middle-school students, their teachers, and their families. At the same time, through the Mass LearnPike, we provide science, math, language arts, social studies, arts, and humanities programming and teacher training at all levels. Massachusetts Star Schools participants are also members of the Mass LearnPike.

Our Electronic Field Trips give focus to a museum exhibit, a trip to a science laboratory, or a visit to an inaccessible location. Special programs bring the world and current events directly to the classroom.

MCET's academic courses do not duplicate those designed by other networks but use Massachusetts resources to extend the present curriculum and to draw on new teaching methods. By coupling academic or cultural presenters with classroom teachers, we are wedding content and pedagogy into new learning configurations.

We direct our staff-development efforts not only to teachers, but also to librarians, administrators, school committees, and families—the forces affecting a child's education. For them too, we incorporate hands-on activities into most series, with materials to manipulate. Forums and conversations may include preproduced classroom examples, events in the field, or scenarios for discussion before the actual program.

Colleges and universities, research institutions, cultural institutions, education collaboratives, public television, cable, corporations, and distinguished individuals have participated in the design and implementation of LearnPike programs. Our goal is to build on existing strengths—locally, regionally, and nationally—and to provide the most cost-effective and high-quality educational opportunities to improve the schools of Massachusetts and the Nation.

*Star Schools: A Vision of Intergenerational Literacy*

The first stage of distance learning across the country brought low-enrollment courses to highly motivated students in remote areas. Because of the impetus of Star Schools, such courses are available to advanced students, rural and urban, who have access to a satellite dish and have course information. The Congressional Office of Technology Assessment report, *Linking for Learning* outlines in clear and comprehensible language present technologies and the early efforts at both programming and access. Its recommendations remain important for Congress to consider.

Today's Star Schools have stretched that vision to include younger students and whole classrooms with a strong teacher component. All of MCET's classes include a teacher-training interaction. We have just begun to understand that today's technologies can do more than we have ever demanded of them. "Couch potatoes" was the widespread image of video use at the start of this decade. Through continued Star Schools support for distance learning that image is changing to that of an Olympic athlete training to compete. The results of MCET research will give good evidence of the effectiveness of active participation, of computer enhancement, video disks, fax, combinations of technologies in entire communities. That research will, we believe, demonstrate a revitalized concept of the family and community as instruments of educational change.

The future of the Star Schools reauthorization legislation must lie in a vision of intergenerational literacy that is inclusive for each community, that incorporates the use of local resources, that encourages technological growth and experimentation, that builds new programs upon demonstrated strengths, and that makes available necessary resources for national distribution of high-quality programming.

In examining successful learning, localized or international, scholars have identified many factors. No one aspect appears more important in scholarly research than the role of the family or community. Immigrants at the turn of the century, supported by their extended families, sought to learn at night schools and local libraries. Churches, prisons, and hospitals have played significant roles in providing learning opportunities. In none of these institutions have there been arbitrary age barriers to educational offerings. Today we have a nation with desperate literacy needs—a nation whose people no longer read to one another other—indeed, a large part of the population lacks the ability to read at all. We can not teach math and science, history and geography, without addressing reading as the basic linchpin. From that base, Star Schools funding should support development of community learning in basic skills, as well as such immediate needs as drug and alcohol awareness. Drawing together family or community groups of different ages and experiences through interactive technology will bring education to the conscious attention of those who now consider themselves unserved by the tax dollars they pay for education.

Star Schools can play an essential role in promoting intergenerational literacy, using technology as a springboard for positive action in the traditional learning activity centers of the community. "Distance Learning" can be the new cost-effective paradigm for bringing communities together to find excitement and enthusiasm in learning. At a recent MCET network meeting by satellite a Quincy teacher said, "I don't know the teachers in the next school. Now I feel, I have a whole community that is in this with me!" The opportunity for connected learning became obvious. Reaching out to those in hospitals or prisons, teachers in daycare centers, nursing and retirement homes, community centers, and those who gather in churches or public libraries can reduce misunderstanding, creating powerful new opportunities for learning.

*Collaboration With Local Resources*

With the cooperation of the local cable companies, a few satellite dishes in Massachusetts serve a vast number of schools and homes. Encouragement of this activity and recognition of cable's cooperation would motivate further efforts. Recently, 75 public and private colleges met to discuss joining the Mass LearnPike and initiating a broad spectrum of programs for K-12 students, one another, their alumni, and the public. The cultural medical, government, and corporate communities must be providers, supporters, and users of the ongoing educational activities. When Digital Equipment Corp. offered to send volunteers into each town to act as LearnNet troubleshooters, their initiative bonded a corporation to a distance-learning network. Bull Information Systems, Inc. has underwritten a program on the legislative process, and many other business organizations are considering how they can best work together with MCET. The local PBS channel, WGBH, is a close partner of MCET. We give teacher training for "Nova," and prepare students to watch important programs on broadcast television. Many resources for learning are available from local and national resources that schools can begin to incorporate into the curriculum and the classroom in a systematic way, once these are delivered by distance learning.

*Sharing Technologies*

Although the legislation reauthorizing Star Schools should move to include new audiences and resources, the questions of alternative and emerging technologies must be part of all research and future planning. Prince George's County in Maryland has demonstrated academic resource sharing by using a fiber-optic system and local instructors. NYNEX anticipates a voice-mail project in Massachusetts to bring urban families into close contact with teachers. Southern Bell, AT&T, and other telephone companies have initiated programs that offer significant educational resources to schools. GTE demonstrated, at the 1991 Oklahoma State Distance Learning Conference in Dallas, the splitting of one transponder into multiple channels, cutting the costs of alternative programming. All of the results of such industry experimentation must be made available to the schools of the Nation. We have scarcely begun to understand how to go beyond the limitations of today's technology—we are caught up in its problems, its limitations. We must not be confined by those inadequacies, always living generations behind the corporate world while attempting to prepare our youth to enter its portals. Star Schools assumes that promising new tools will be made available to help cut deeply into present problems—fiscal and educational.

*Expanding Star Schools' Strengths*

It is always tempting allow each new Star Schools grant recipient to begin afresh, providing access to another area, creating more of the same. Tomorrow's Star Schools must have a broader vision. They must take the courses that have been begun, the experiments that have shown value, and incorporate them into their planning and implementation. If we learn that we can restructure science education by involving the whole community with multiple technology delivery, we must build upon that base, not reinvent it. If MCET demonstrates that students must be active learners, doing something at their end of the technological link, bringing together technology and humanity, tomorrow's Star Schools must use that knowledge in reaching other audiences and other disciplines. MCET, if it is to go beyond what it has done, not merely repeat its successes, must be given that opportunity. While universal access is an important goal, the ability to leverage Star Schools funding with the State, the corporate community, other Federal programs, and the foundation world can extend access. Only Star Schools legislation has taken the risk of allowing the use of many delivery systems to improve education.

*The Need for Nationwide Resources*

Many excellent programs have come out of prior Star Schools grant recipients. Over 200 hours of satellite programming, video disks, and other products come from MCET alone. It is not necessary for any other State to create a Spanish or Japanese course that exists on several networks, if there is information and sharing among the States. No State or network has the resources to make information about its programming available to the Nation. For-profit producers have an interest in keeping program-access prices high. State buys of programming are necessary to keep down local costs. Most State or regional networks, while capable of supporting national participation in their programs, have not the means to let the Nation know what is out there in a systematic manner, let alone take care of marketing and distribution costs and 800 numbers. The long-term cost-effectiveness of distance learning and its efficacy depend upon business plans that carry a revenue stream from sales of product beyond the region. Local buy-in by school systems, a strong State commitment, and leadership at the Federal level that calls for collaboration and coordination are necessary to sustain and grow the use of technology networks for our Nation's children and their families.

*A Few Quotations*

From a teacher:

"Beautiful things were happening in the classroom. Kids were helping kids. They were teaching each other. They were supporting each other, and cheering themselves on."

From a superintendent:

"Don't you know that this electronic meeting is saving me money—2 1/2 hours travel each way and 2 hours for the meeting. My time counts. This is terrific."

From a principal:

"I walked into the class, and the kids were hacking at pineapples and coconuts. The teacher was from the Arnold Arboretum. Where could we get these resources to teach our kids in Westborough?"

From Barry Posen, MIT faculty:

"Questions about the draft are important to these kids, perhaps the most important issue.

From an observer:

"What a fantastic experience it was. From the very beginning of the broadcast, the kids were singing and moving with DeAma [dance instructor and performer]. She had immediately captured their attention and affection. Even when told to quiet down . . . they continued to sing softly, completely focused on the screen. There is feeling. Warm feeling. A sense of community."

*A Final Plea*

Star Schools has been a catalyst for dynamic change in education, new delivery systems for learning, and the beginning of community building—local and regional. Tomorrow, give us the tools to reach out to the greater community and learn together. Then let us come together in exchanging our resources as a nation and a world.

The CHAIRMAN. I'll ask Gary Vance if there's anything you'd like to add on the theme here, or respond to what Senator Kerrey or others have mentioned during the course of the hearing.

Mr. VANCE. I appreciate that very much, Senator. I have included my remarks in the written testimony which I have asked to be placed in the record. I certainly support many of the things that Inabeth is saying, and we certainly encourage your continued support of the Star Schools legislation.

We believe there is much left to be done because there are many schools left unserved. The 600 schools that SERC serves are very appreciative of what they are able to get, but there are many, many schools in those States as well as other States that still do not have the necessary downlink equipment they need to receive these resources. And the economies of scale that will be recognized by being able to grow in that way will be of benefit to all of us, I think.

The CHAIRMAN. Is the limitation primarily financial?

Mr. VANCE. At this point in time in terms of schools, I would suggest that it is, because it is a major step for schools to move into that initial step of installing the equipment that literally connects them to the world, not only to SERC, but to other distance learning projects and to the Soviet Union, to European offerings that they may be able to pick up.

The legislation that you provided in the first round of Star Schools is one of the major reasons we were able to move so fast so quickly, and economy of scale will be the way that we are able to move this almost exclusively to a self-supporting organization.

The CHAIRMAN. Let me ask for each of your reactions on the panel. One of the principal admonitions that we've had is that we want to keep this a high-quality program, and as Senator Kerrey pointed out, there have been other programs that have used high-tech television that have not been successful. I think at least I am convinced, even more so after today, of the importance of what we have seen to date.

We've got other very important needs—we have the problems of illiteracy, we have the underutilization of even this technology, perhaps, only being used for part of the day, very important needs in other areas, thinking about how we are going to get the private sector more involved, training programs, and other things. How do we guard against not going too fast too soon and still be able to achieve the basic point of this, in terms of math and science and language? We are beginning to make some progress, but I fear certainly in our State with the reductions in school support in local communities—we've got 38 States with deficits, and they are cutting back on education programs all over this country—whatever we are gaining on one side, I'm concerned about losing on the other. How do we guard against getting so stretched out that we're going to begin to lose the kind of edge that has been demonstrated in the programs to date?

Ms. CARSON. There has been an intense and interesting competition for these grants. I would say that as long as the legislation is flexible and the department is encouraged to focus on results as opposed to process, there is an opportunity to look for innovation, there is an opportunity to look at the quality of teaching that will be involved, and also, as both the speakers pointed out, for new ways to use technology interactively. A lot of what we know about learning is putting people together in new groups with new stimulations.

I think if we expect and ask for a focus on results and an attitude that looks at what is going to come out of this program, what is new and interesting, as opposed to replicating the past, that would help. It is always more fun at first, it is always easier at the start, and of course, there are tremendous demands being placed on schools at the moment. So if we can keep it in the realm of experimental and new, I think that helps.

Dr. MILLER. Senator, in Massachusetts we are regarded as the one bright light, the one thing that is happening in education in our State that is exciting, that is dramatic, that is responsive to their needs, while art and music and phys ed and science and hundreds of courses are disappearing in every school, while teacher training is gone because of the fiscal situation.

Here, through this technology, our schools, our teachers, our superintendents are able to access on a daily basis—next year, we will have over 70 program offerings, 5 days a week, at least 6 hours a day, and those will go to the whole community.

We have found that every single corporation that we have approached is interested. In fact when you talked about access to downlinks, there are many ways that people can get downlinks. We don't find that downlinks is really a big problem. Corporations are willing. Some college have paid—Salem State for Salem schools, Bridgewater State for Bridgewater schools.

We have to remain responsive to the needs of the schools in the community. We have to remain terribly interactive. Our programs have an interaction every 3 minutes. These are the kinds of things, and we have to have people doing things. I can't tell you—I really wanted to have someone from Massachusetts teach the Senators to do something this year, and maybe another time we'll be able to—but I'm not worried about us growing too fast. I am worried about us having the breaks put on us so that we can't continue to develop on the very strong roots that we've built.

Mr. VANCE. Senator, I would only add to that, we do talk about technology—and I mentioned this in my opening remarks—but technology is not the solution to educational problems; it is discovering the needs and then using the tools of technology to address those problems. I would still support the idea that especially on a national level with States with very sparse populations and perhaps small numbers of corporate supporters, there is continued need for support, for helping get the original technology in place. But our future, as both of the other panelists have mentioned, lies in continued evaluation, continued examination, and a continuing effort to respond to the educational community and to the experts who are able to work with us in identifying the needs. That will be the strength of what happens in the future.

I hope we have demonstrated today with all these programs we've come a long way, but we are still in our infancy, and if you bring us back in 3 years you will see things that will make this look like the infancy.

The CHAIRMAN. Thank you.

Senator Cochran.

Senator COCHRAN. Thank you, Mr. Chairman.

I think this panel has really been very helpful in giving us a perspective of what we ought to be trying to do with this new legislation, the reauthorization and extension of the Star Schools program. I am glad to have been able to join Senator Kennedy in cosponsoring the introduction of this bill yesterday and to support the passage of it.

I do want to make sure that we try to expand the scope in terms of the students who are being served by the program and at the same time try to do something about exploring controlling the operational costs. I think this is something we really have to work on because the startup cost of any new highly technical program, is going to be substantial, and this is. This experimental program some say may be too costly for the number of students who are actually benefiting from the instruction, and that's a criticism we are going to have to deal with and meet in an effective way if we

expect this program to continue and to be reauthorized by the Congress and funded.

One encouraging thing is that the administration requested money in its budget for this program this year. Everybody complains about the administration not putting enough money into anything—that is standard, and you hear that every year, particularly from that side of the committee—but the fact of the matter is I think this administration is very serious about trying to use innovative technologies, figure out ways to take advantage of modern technologies in a more effective way. But the operational costs are going to have to be addressed because we don't have the total huge pile of money that we'd love to be able to use to fund programs of this kind, so we're going to have to be careful in that regard.

I just want to congratulate all of you for being a part of this. It is exciting, and I think it fits in with one of the parts of the President's America 2000 proposal, the new American schools concept, the break-the-mold approach that Secretary Alexander has talked about; it fits with what Inabeth Miller so impressively said in her testimony—let's explore all of the opportunities and get everybody involved, corporations, communities, individuals. It is everybody's job.

So I just want to let you know that I am on your side, and I hope we can all develop a consensus for action this year in the Senate and also throughout the Senate.

Thank you, Mr. Chairman.

The CHAIRMAN. We'll leave the record open for additional questions, and we'll depend on Senator Cochran to come up with the money, as a member of the Appropriations Committee. [Laughter.] He has been a very enthusiastic supporter all the way through from the start of the program.

OK. I have additional questions, but we have another panel, and I've been notified that we're about to have a vote over in the Senate, so we'll submit the other questions to you, and if you'd be good enough to respond in writing.

Thank you very much.

The CHAIRMAN. Our last panel will concentrate on the role of business in distance learning programs.

Gregory Liptak is president of Jones Spacelink and also president of the Mind Extension University in Englewood, CO. He is accompanied by Nancy Buccy.

We also welcome William Werwaiss, who is vice president and assistant general manager of Southern New England Bell Telephone in New Have, CT.

We welcome all of you and thank you for coming. Senator Dodd particularly wanted to welcome our New England Bell Telephone friends from New Haven and asked me to express his welcome to you for him.

We'll start off with Mr. Liptak.

**STATEMENTS OF GREGORY J. LIPTAK, PRESIDENT, JONES SPACELINK, AND PRESIDENT, MIND EXTENSION UNIVERSITY, ENGLEWOOD, CO; AND WILLIAM F. WERWAISS, VICE PRESIDENT AND ASSISTANT GENERAL MANAGER, SOUTHERN NEW ENGLAND BELL TELEPHONE, NEW HAVEN, CT; ACCOMPANIED BY KATHLEEN BUCCY, MANAGER, LINKING TO LEARNING**

Mr. LIPTAK. Thank you, Mr. Chairman, for permitting me to come from Colorado today to present testimony on this important issue.

I am the president of Mind Extension University: The Education Network, a basic cable television service. In my brief statement this morning I'd like to present three points relative to distance education.

Point No. 1. At the end of 1990, the American cable television industry served nearly 55 million subscribers. Cable TV, which now offers more than 100 satellite program services, is the envy of the world, a technology that Americans are exporting around the globe.

One unique cable service is Mind Extension University: The Education Network, founded in 1987 by my chairman, Glenn R. Jones. Mr. Jones' concept was to "make all America a school", to combine the technology of cable and satellite television with the resources of the Nation's top distance learning providers, to create a nationwide electronic classroom without walls.

ME/U, as it is known, is now the fastest growing cable network in America. By early next year, perhaps as many as 40 million Americans will have access to the channel in their homes.

The network has been called "a lifelong learning resources" for a community because it presents several major program elements 24 hours a day, 7 days a week. On school days, it retransmits the live, interactive, direct instructional material provided by the TI-IN Network. We offer foreign language, mathematics, science and student enrichment programs as well as professional staff development for teachers.

In addition to secondary instruction, Mind Extension delivers graduate and undergraduate courses, including an MBA program and, starting this fall, a bachelor's degree completion program in cooperation with the University of Maryland University College. We offer literacy, GED preparation, English as a second language, and with the Library of Congress, we present each week the Global Library Project. This project, funded by a $1 million grant from our company, seeks to develop interesting programs from the vast visual resources of the Library of Congress. A number of your colleagues have already appeared on some of the programs.

We are affiliated with 20 of the Nation's most prestigious colleges and universities, including Penn State, Kansas State, University of South Carolina, to name a few.

My second point is to encourage legislation which will use the existing infrastructure for the delivery of distance learning. The cable television industry, with a full video pipeline into nearly 60 million homes, presents an efficient system that is already in place for the delivery of educational materials. System operators have committed to make cable service available to every public and pri-

vate junior and senior high school at no charge through the Cable in the Classroom Project.

In addition, there are other transmission techniques—fiberoptics systems, ITFS, low-power television—which are available today to deliver these materials.

In my judgment the cost of constructing a totally new, redundant infrastructure for educational purposes is not only prohibitive but also unnecessary, especially in view of the sites already developed by earlier Star Schools funding.

The CHAIRMAN. I apologize for interrupting, but could you just expand on that? How is that being phased in now, and over what period of time?

Mr. LIPTAK. The Cable in the Classroom Project, Senator, whose participants represent in excess of 80 percent of subscribers in America, have committed to put free cable service into every public and private junior and senior high school by the end of 1992. So that's the date we've all committed to.

New technological developments hold even greater promise. When new video compression technology is brought to market over the next decade, a major expansion of channel capacity will occur.

My third point deals with the funding of distance learning in the United States. Our secondary school program provider, the TI-IN Network, was the managing partner of an original recipient of a Star Schools grant in 1988. The seed money you provided enabled the TI-IN United Star Network to provide interactive instructional services to 316 sites serving more than 20,000 students with credit and noncredit courses, and more than 100,000 teachers with staff development.

The Office of Technology Assessment has documented the effectiveness of distance education and of TI-IN's approach in its report we heard about a few minutes ago, "Linking for Learning: A New Course for Education." In fact, the success of the TI-IN research and demonstration Star Schools project led OTA to introduce TI-IN to the Mind Extension University network, thus providing a lowcost, efficient way to disseminate quality education not just to schools, but also into the living rooms of America.

I want to encourage you to help fund the ongoing program development for these networks. Some of the poorer schools that were involved in early Star Schools funding simply have not had the financial wherewithal to continue the program once the demonstration project ended.

We do not need more hardware. Satellites, Earth stations and distribution systems are largely in place and available for more than 80 percent of our schools. What we do need is money to finance the development of programming, that is, new distance learning programs for use at the local school level.

Help the schools across America, particularly educationally and economically disadvantaged schools in both rural and urban settings, to pay the modest sums necessary to provide access to master teachers and distance learning techniques. A 2-year demonstration project is not enough.

I know I speak on behalf of my cable television colleagues when I say that as an industry we stand ready to provide the cost-effective way to deliver quality distance learning projects to America. We

can, in the words of Glenn Jones, bring the facilities of satellite and cable television together in order to "make all America a school".

Thank you very much.

The CHAIRMAN. Thank you.

[The prepared statement of Mr. Liptak follows:]

PREPARED STATEMENT OF GREGORY J. LIPTAK

Thank you, Mr. Chairman, and members of the Committee for permitting me to come from Colorado today to present testimony on this important issue.

I am the president of Mind Extension University: The Education Network, a basic cable television service. In my brief statement this morning I would like to present three points relevant to distance education.

Point No. 1—At the end of 1990, the American cable television industry served nearly 55 million subscribers. Cable TV, which now offers more than 100 satellite program services, is the envy of the world, a technology that Americans are exporting around the globe.

One unique cable service is Mind Extension University: The Education Network, founded in 1987 by my chairman, Glenn R. Jones. Mr. Jones' concept was to "make all America a school," to combine the technology of cable and satellite television with the resources of the nation's top distance-learning providers to create a nationwide electronic classroom without walls. ME/U, as it is known, is now the fastest growing cable network in America, currently serving more than 12 million cable and satellite-dish households, with an additional 3.5 million expected to launch by this fall. By early next year, therefore, perhaps as many as 40 million Americans will have access to the channel.

The network has been called "a lifelong learning resource" for a community because it presents several major program elements. On school days, it retransmits the live, interactive, direct instructional material provided by The TI-IN Network of San Antonio. We offer foreign language, mathematics, science, and student enrichment programs, as well as professional staff development for teachers. One real-life story of distance learning concerns Remigio "Mico" Perales, a young man from Nordheim, in south Texas, population 369. Mico took his advanced mathematics and science courses—not available in his high school curriculum—by this interactive televised distance-learning technique. His performance earned him a scholarship to MIT.

In addition to secondary instruction, Mind Extension University delivers graduate and undergraduate courses, including an MBA program and, starting this fall, a bachelor's degree completion program, in cooperation with the University of Maryland University College. We offer a literacy program, GED preparation, and English as a second language program. With the Library of Congress, we present each week the Global Library Project. This project, funded by a $1 million grant from our company, seeks to bring to the nation the largest repository of information in the world. A number of your colleagues have already appeared on some of the programs.

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My second point is to encourage legislation which will use the existing infrastructure for the delivery of distance learning. The cable television industry, with a full video pipeline into nearly 60 million homes, presents an efficient system that is already in place for the delivery of educational materials. System operators have committed to make cable service available to every public and private junior and senior high school at no charge. In addition, there are other transmission techniques—fiber optics systems, ITFS, low-power television—which are available today to deliver these materials. In my judgment the cost of constructing a totally new, redundant infrastructure for educational purposes is not only prohibitive but also unnecessary, especially in view of the sites already developed by earlier Star Schools funding.

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## A Changing Environment

The demographic and social changes that have been developing over the past three decades are now having a strong impact on our entire education system. For example, our past assumptions about who the "typical" college student was as well as how, when, why and where that student attended college are no longer valid. Today our colleges and universities are faced with new facts.

As a society we are changing our view of education. We no longer define a college education as something we do between the ages of 18 and 22; we are coming to understand and embrace the concept of "lifelong learning."

Ken Dychtwald and Joe Flower in their book *Age Wave* described this changing approach to education:

You may stop working one or more times in your thirties, forties, or fifties in order to go back to school, raise a second (or third) family, enter a new business, or simply to take a couple of years to travel and enjoy yourself. You may go back to work in your sixties, seventies, or even eighties. You may find that the traditional framework of life—with youth the time for learning, adulthood for non-stop working and raising a family, and old age for retirement—will come unglued, offering new options at every state. A cyclic life arrangement will replace the current linear life plan as people change direction and take up new challenges many times in their lives.

In fact, numerous studies undertaken in the past several years by industry groups, the government, public institutions, and private foundations are projecting that by the year 2020 the average worker will undergo *at least* 5 major job changes in his or her lifetime.

## Issues in Higher Education

### *Changing Student Population*

Enrollment of the "traditional student" at America's colleges and universities is dwindling. As late as 1979, traditional full-time students, 18–22 years old and usually straight out of high school, numbered 4.5 million. By 1992 enrollment of traditional students is expected to fall from the 1979 high to 3.1 million, a decline of 32 percent.

As traditional students represent less and less of higher education's student body, adult learners are stepping in to fill the void. These students are typically 25–35 years old and are employed at least part-time. Many of them have employers who are paying for some or all of their education costs. These students deal with scheduling conflicts, difficulties in getting to campus, geographic relocation brought on by job transfers, and frequently the extra demands of parenthood.

Adult learners typically have little interest in the expensive "extras" of college such as social and athletic events, association with sororities or fraternities, and various other on-campus organizations and activities. Their needs are primarily for

flexible scheduling, affordable prices, and attendance options. Such students exist in all types and levels of education, and they are found virtually all around the globe.

*Access to Education*

Access to higher education for geographically distant students, those who must travel, and others who cannot attend campus-held classes is becoming a higher priority for the country. As Americans perceive the importance of a college education to their careers, to their quality of life, to our economy, and to their children's futures, they are becoming increasingly concerned about universal access to higher education. This point is dramatically made by Johnston and Packer in *Workforce 2000* in their prediction that:

During the 1985–2000 period, the good fortune to be born in or to immigrate to the United States will make less difference than the luck or initiative to be well-educated and well-trained. For individuals, the good jobs of the future will belong to those who have skills that enable them to be productive in a high-skill, service economy. For the nation, the success with which the workforce is prepared for high-skilled jobs will be an essential ingredient in maintaining a high-productivity, high-wage economy.

*Teacher Shortages*

Another change affecting higher education is the teacher shortage predicted for at least the next two decades. In their recently published *Prospects for Faculty in the Arts and Sciences*, co-authors William Bowen and Julie Ann Sosa confirm what educators have suspected for several years: by the late nineties, a substantially increasing rate of enrollments in higher education will result in major shortages of faculty members at colleges throughout the nation.

As the children of the 77 million baby boomers move through our colleges and universities, they will expand demand for faculty at the same time that many professors, hired to meet the baby boom demand of the 1950s and 1960s, are scheduled to retire. Unless a means is found for delivering education to more students without radically increasing the demand for added faculty, many would-be students will be closed out of the higher education system. At a time when our global competitors are exploiting every opportunity to seize existing markets and outrace us to new ones, the nation cannot afford an undereducated workforce. The productivity of America is at risk; our competitive edge is at stake.

*Cost Increases*

Perhaps the most pressing concern regarding higher education is the astounding increase in the costs of attending college. Recent surveys have found that the cost of higher education during the first 7 years of the eighties rose 81 percent for private institutions, 61 percent for public universities. Costs continue to outdistance inflation. This rapid increase in cost effectively denies educational opportunity to those unable to afford its escalating expense.

These statistics represent a national crisis: education is one of the few industries in America that is becoming less rather than more productive. This is not a minor issue, since the higher education segment alone employs some 2 million people, a third of them faculty members, and annually enrolls nearly 12.5 million students. Thus about six percent of the American population either works or studies within the higher education structure.

Part of the problem with costs relates to the expansion and upgrading undertaken by American colleges and universities in the past 2 decades. This was necessary in order to meet the growing enrollment of baby boom students and to remain academically competitive. In its quest for quality, however, the higher education system has invested in advanced technology and costly physical plants that often sit unused for 4 to 5 months each year. This problem will worsen as residence halls, no longer filled with traditional college-age students, have even more empty space that continues to incur maintenance costs.

*Worker Retraining*

Businesses and labor leaders are recognizing the importance of retraining American workers so that their skills meet twenty-first century employment needs. As the industrial and manufacturing base in the United States continues to erode, the knowledge economy continues to grow. Although the definition of what constitutes "information work" is undergoing continued re-evaluation, there is now a consensus that nearly fifty percent of American workers are employed in some aspect of the "knowledge" or "information" economy. Consequently, our competitive edge in what is now a global marketplace will be based on our ability to teach our workers not

just to be technically proficient, but to think, to evaluate, to adapt, to use information resources, and to become lifelong learners.

These skills will be critical in all areas of American industry, not just among top-level management. Without question, this will be a massive undertaking. Equally without question, it is crucial to our ability to maintain an international competitive edge.

Economists estimate that as many as 30 million people have been dislocated by the "restructuring" in manufacturing during the last decade. In his *Thriving on Chaos*, Tom Peters notes that "since 1980 the Fortune 500 have shed a staggering 2.8 million jobs." More restructuring will take place as these companies respond to marketplace demand and competitive threats.

The changing nature and skill requirements of the American workplace have been comprehensively documented by Johnston and Packer in *Workforce 2000*:

As the economies of developed nations move further into the post-industrial era, human capital plays an ever-more-important role in their progress. As the society becomes more complex, the amount of education and knowledge needed to make a productive contribution to the economy becomes greater.

Later in their analysis, Johnston and Packer state:

The jobs that will be created between 1987 and 2000 will be substantially different from those in existence today. A number of jobs in the least-skilled job classes will disappear, while high-skilled professions will grow rapidly. Overall, the skill mix of the economy will be moving rapidly upscale, with most new jobs demanding more education and higher levels of language, math and reasoning skills. . . . Among the fastest-growing jobs, the trend toward higher educational requirements is striking. Of all the new jobs that will be created over the 1983–2000 period, more than half will require some education beyond high school, and almost a third will be filled by college graduates. Today, only 22 percent of all occupations require a college degree.

Clearly, new tools and concepts are required to master this rampant change in our environment. Higher levels of education are imperative.

The turbulence of change and the necessity of adjusting are manifest. Yet, for the worker who needs retraining, the military man or woman, the rural adult learner, the gifted high school student with no opportunity to take college-level classes at his or her local high school, shift workers, homebound parents, and various others, access to educational opportunities generally and to college coursework and credit specifically has been difficult, if not impossible.

## Issues In Elementary And Secondary Education

As our higher education institutions have grappled with shifting circumstances, America's elementary and secondary schools also had to chart new territory. They have been attempting to meet 2 important goals: enriching the classroom experience and providing access to a wide and varied education. In addition, these 2 issues, frequently referred to as "excellence and equity," have been accompanied by a host of other considerations.

### *State-Mandated Changes*

New, state-mandated changes in curriculum call for more breadth and depth in courses that schools, particularly at the secondary level, are required to offer. These reforms effect schools of every town, city, county, and school district in America.

Requirements for high school graduation have been radically upgraded in many states, with special emphasis placed on mathematics, science and languages. State colleges and universities across the country are also emphasizing the importance of these subjects by elevating admission requirements in these areas. Unfortunately, the task of meeting requirements at both the secondary and college levels is aggravated by a shortage of appropriate teachers and budgetary pressures.

In addition to the curricular changes called for, most states now require teachers to participate in professional development or in-service training courses on a regular basis. However, for many teachers such courses are unavailable, inaccessible, or at best inconvenient. Yet the importance of professional development cannot be underestimated. To keep pace with the expanding educational requirements of their students, teachers must stay current with the most recent advances in their fields.

Low national test scores and the poor showing of American students relative to students from other nations are more than discomforting. Our students are confronting the onslaught of an information age and the cry for change is clear and compelling.

*Teacher Shortages and Budget Constraints*

As noted in *Linking for Learning*, the report on distance education issued in 1989 by the Department of Commerce's Office of Technology Assessment,

> Shifting economic and demographic patterns have left many small and rural schools with declining student populations and even more limited financial and instructional resources. . . . Solutions such as school consolidation or transporting students or teachers have often been stretched to their geographic limits; these approaches are also disruptive and politically unpopular.

Yet these schools must provide the basics of a good education and, if possible, broaden their students' intellectual exposure beyond the confines of their immediate locale.

Struggling to provide a "basic" education to all students, many schools have few remaining resources with which to meet the unique needs of individuals who either have difficulty learning or are intellectually gifted students. This is especially true for schools located in areas that are culturally isolated, economically disadvantaged, or both.

When resources must be stretched to address the needs of the majority of students, there is a painful recognition that gifted students, some of whom perhaps have the potential to provide signature insights about our world and its problems, may go unchallenged. This is a painful situation because unless such students are challenged early their ability to see unique relationships and to optimize their conceptualizing skills may be lost forever.

Teacher shortages are yet another area of concern. The current shortage of qualified teachers in 3 key areas—math, science, and languages—is projected to worsen dramatically over the next 2 decades. For lack of a better alternative, some secondary schools have resorted to hiring teachers to teach subjects for which they are less than fully prepared. Finding teachers qualified to teach English as a second language is particularly critical in many locations.

This problem is shared by both rural and urban schools. Often schools cannot afford the luxury of hiring teachers for courses such as trigonometry or Latin if only a few students will enroll. And some schools cannot convince subject-qualified teachers to relocate to their geographic area.

The ongoing dilemma of whether to focus financial and teaching resources on breadth or depth in the curriculum presents yet another problem for America's schools. Struggling with budget and personnel constraints, many schools must choose between offering their students an extensive, broad-based curriculum that covers a large number of subjects lightly or an intensive, highly focused curriculum that covers key subjects in depth but other areas only superficially, if at all.

This dilemma cuts to the heart of the curricular reform debate: will a broad-based, general education or a more focused (for example, concentration on math and science) education better prepare students for the world they will face as adults? Although proponents for both sides of the debate have presented compelling rationales over the past several years, most educators still believe the goal is to find a way to offer both breadth and depth, ensuring the most comprehensive educational grounding possible.

## Distance Education: An Innovative Solution

As social, demographic, and financial changes developed over the past 3 decades, leaders in education worked to fashion new responses to these changing circumstances. Some of the most successful of the evaluated programs involved distance education, a form of instruction in which the student is linked to the school through a faculty member, but is not necessarily attending regular classes on campus or even in a classroom. Essentially, learning takes place "at a distance."

Of the distance education alternatives, telecourses, or televised instruction, proved to be one of the most promising. Advances in communications technologies such as cable television, fiber optics, microwave, slow-scan television, satellites, microcomputer networks, fax machines and videocassette recorders (VCRs) have allowed telecourse design and delivery to become even more effective.

*Development of Telecourses*

Telecourses have been part of this country's educational delivery system since television classes were first broadcast into America's homes more than 30 years ago. Typically received by ordinary home antennas from local broadcast television stations, these early, rudimentary telecourses brought traditional classroom presentations directly into the student's living room.

Chicago Citywide College, an extension of the City College of Chicago, took the lead in testing and developing this new education delivery system. Supported by a grant from the Ford Foundation's Fund for Advancement of Education, Chicago Citywide College began broadcasting telecourses over Chicago's public educational television station, WTTW, in 1956. From those early days of trial-and-error experimentation, Chicago Citywide College has continued its commitment to expand the applicability and enhance the effectiveness of telecourse instruction. And, although many other colleges have since followed its lead, TV College is generally recognized to have set the stage for the educational television we have today.

While Chicago Citywide College was establishing itself, another Ford Foundation-supported project for television in higher education was begun at The Pennsylvania State University, also in 1956. The purpose of the Penn State project was to explore the potential use of closed-circuit television for on-campus instruction. A successful undertaking, the project had produced 28 courses for the university by 1966.

Widespread experimentation with telecourses continued through the sixties, seventies, and eighties, with Michigan State University (East Lansing, Mich.), American University (Washington, DC), Case Western Reserve University (Cleveland, Ohio), and Iowa State University (Ames, Iowa), among others, exploring the possibilities offered by instructional television. Colleges and universities worked with teachers, instructional designers, graphic artists, educational technologists, and students to find the most effective ways to create and deliver telecourses.

Some schools established, owned, and operated their own television stations in the mid-fifties; examples include the University of Nebraska-Lincoln (KUON) and the University of North Carolina at Chapel Hill (WUNC). Several of these have since developed into highly effective statewide networks. However, colleges and universities that did not own a station or a closed-circuit system got their opportunity to experiment with television courses when the commercial networks became interested in educational television in the late fifties.

WCBS/New York first broadcast the "Sunrise Semester" series in comparative literature in 1957. By 1958, NBC was broadcasting "Atomic Age Physics" on "Continental Classroom" over 150 network stations across the country. Funded in part by a grant from the Ford Foundation, the physics series received high marks from educators for academic quality and the usefulness of the accompanying support materials for students and local teachers. More than 300 colleges and universities offered "Atomic Age Physics" the first year, and several other courses followed in succeeding years. Unfortunately, the series required heavy subsidy, and NBC dropped it a few seasons later. Nevertheless, educators, programmers and producers learned valuable lessons about telecourses from the experience: a program with high academic standards could be created that would be accepted by teachers and students; a market for such programs existed; and, as always, financial issues needed to be considered. In 1963, CBS made "Sunrise Semester" available to its network stations, and the highly successful program continues today.

Another landmark event for telecourses in the early sixties was the passing of the Federal Educational Television Facilities Act of 1962. This legislation empowered the federal government to fund the building and equipping of public television stations, thereby extending their broadcast reach. In response to the growing interest in telecourses, the Great Plains Regional Instructional Library was created in 1963 by an agency of the KUON-TV/Nebraska ETV Network in affiliation with the University of Nebraska-Lincoln. The library's goal was to serve as a clearinghouse that would acquire, maintain, and lend to schools those programs and series that had continuing educational value. Headquartered in Lincoln, Neb., the library now houses some 2,300 educational programs for elementary, secondary, and higher education and produces the young reader "Reading Rainbow" series for the Public Broadcasting Service.

Probably the biggest advance for educational television occurred with the passage of the Public Broadcasting Act of 1967, which recognized the potential of broadcast television to inform and enlighten (as well as entertain) the public. This legislation authorized the creation of the Corporation for Public Broadcasting (CPB), which was charged with the "responsibility of assisting new stations in getting on the air, establishing one or more systems of interconnection, obtaining grants from federal and other sources, providing funds to support program production, making grants to stations to support local programming and conducting research and training projects."

The Corporation for Public Broadcasting was not a production or networking facility. Instead, another entity, the Public Broadcasting Service (PBS), was created in 1969 to serve as CPB's television network. Its functions were to select, schedule, and distribute programming for the widespread system of PBS-affiliated stations.

Through that network, a nationwide system of public television had come into being by the end of the sixties.

In addition to the creation of CPB and PBS, further progress for educational television came with the creation of the British Open University in 1969. Championed by then-Prime Minister Harold Wilson, the Open University was created as an alternative system for achieving a higher education degree. Its courses blended print, video, and radio presentations with campus visits and were designed to appeal to students unable to attend universities full-time or "in residence." To support the needs of its far-flung students, the Open University established several sites throughout Britain where students could go for tests and to meet with tutors. Beginning with an enrollment of 40,000 in 1971, it now enrolls about 64,000 students per year throughout the United Kingdom. The Open University, which has distributed its course materials for use in this country and now has branches in several other countries, helped set the precedent for using television as a key component of basic higher education courses.

In the mid-seventies, colleges and universities began producing their own telecourse series and related support materials to attract broader audiences and extend the reach of their campuses. Miami-Dade Community College (Miami, Fla.), Coastline Community College District (Fountain Valley, Calif.), and Dallas County Community College (Dallas, Texas) were 3 of the schools most active in this field. Since then, many schools have joined together in regional consortiums that currently produce some of the best telecourse programs available throughout the world.

The eighties witnessed an explosion of alternative instructional delivery systems for public elementary, secondary, and higher education in America. Fueling major research and experimentation during this period was Ambassador Walter Annenberg's establishment in 1981 of the landmark Annenberg/CPB Project, through which the Annenberg School of Communications contracted to provide $10 million a year for 15 years to CPB. The goal of the project was to expand opportunities for individuals to acquire a quality college education at an affordable cost. To that end, the project supported the development of a collection of telecourses that could be offered to students at more convenient times and places than the traditional classroom hours. It also funded demonstrations of new applications of the telecommunication and information technologies in higher education. The purpose of this funding was to explore improvements in education made possible by advances in technology.

Based on the results of such undertakings, projects utilizing telecommunications technologies such as satellites, cable television, fiber optics, microwave, slow-scan television, microcomputer networks, fax machines and VCRs have opened up new and exciting opportunities for those interested in distance education.

In the nineties, our challenge will be to build upon the insights and experience gained in the past 3 decades. These advances have created unprecedented opportunities to tailor education to the needs of the students, rather than having students structure their education around the needs of the institution. ME/U's goal is to ensure that as many students as possible, no matter what their circumstances or location, can take advantage of these opportunities.

With broad-scale ability to become educated comes broad-scale opportunity, economic and otherwise. With recognizable opportunity and broad-scale access to it comes a broad-scale sense of fairness and hope. A sense of fairness and attitude of hope are positive elements in both the individual and national psyches. America needs these elements. They are confidence-builders personally, organizationally and nationally.

## Mind Extension University: The Education Network

In November 1987, Mind Extension University was launched as a basic cable television channel designed to meet diverse needs for education, information, and instruction.

Originally, the network's programming focused primarily on for-credit, college-level telecourses in such areas as science, fine arts, English, mathematics, foreign languages, and general business. In addition, a variety of pre-college educational programs and personal enrichment programs were offered. ME/U has since broadened its course offerings to meet the needs not only of college-level students but also of elementary and secondary school students and their teachers.

### *College-Level Courses*

Since ME/Us inception, all credit courses have been led by course instructors from prestigious colleges and universities across the nation. As in traditional on-campus classes, each course requires textbooks, assignments, and exams. Direct or

two-way contact with instructors is handled by mail, phone and, in many cases, teleconference. Once a student completes a course, credit is granted by the institution offering the course. These credits may be transferred to other schools.

Recently adding an MBA program, ME/U continues to expand its course offerings, and is currently exploring the possibility of offering courses from other countries. However, the standard for courses has always been the same: students should receive the best course from the best teacher. Concurrently, the teachers expect the best from their students.

Four factors are considered especially important when selecting those schools and colleges whose courses are carried on ME/U. These are:

—quality of telecourses,
—ability of instructors,
—experience with the theory and practice of televised education, and
—proven support on the part of the institution's leadership for telecourse instruction.

Based on these criteria, 18 colleges and universities have become part of ME/U programming to date, and more are in the process of joining the network.

Colorado State University in Fort Collins, Colo., was the first school to become part of ME/U. This university has been a leader in the area of telecourse instruction for 20 years and is nationally recognized for its SURGE program, which specializes in video-based courses for business and industry users. Their faculty has a strong commitment to televised instruction, a commitment that is echoed by the administration through additional salary and graduate student support. The university's College of Business, a 20-year leader in video-based, graduate business education, is now offering through ME/U the first American Assembly of Collegiate Schools of Business-accredited MBA by satellite broadcast and cable delivery.

*Elementary and Secondary School Courses*

A broad range of courses to meet the educational needs of the nation's elementary and secondary schools is provided by ME/U through a cooperative agreement with the TI-IN Network. TI-IN Network is a Texas-based provider of live, interactive television instruction.

These courses are delivered to schools each day as part of ME/U's regular educational programming. This programming currently encompasses 21 high school credit classes in science, the humanities, foreign languages, and math. The courses include subjects that would be impossible for many small, economically disadvantaged, or geographically remote schools to provide—for example, marine science, trigonometry, Japanese, French and staff development programming. Student enrichment programs tailored to specific grade levels (elementary through high school) supplement the for-credit courses.

## How Mind Extension University Works

Mind Extension University courses are transmitted by satellite to cable television systems, then by cable into students' homes or businesses as well as to libraries and school classrooms.

*College-Level Courses*

Usually students use a videocassette recorder to tape the class, then replay it at their convenience. This enables students to fit coursework into their own schedules and gives them the opportunity to review classes in order to more fully understand the topic's concepts or the instructor's points. Students who miss a lesson can call the ME/U Student Support Center, and a representative will immediately send a replacement tape so that there is little interruption in the continuity of the course.

Each month, a program schedule listing the course offerings for that period is sent to students and others who have indicated an interest in the telecourses. (Research indicates that most ME/U students "preview" or watch a course at least once before enrolling in it.) Registered students receive a syllabus that lists an entire semester's schedule of their courses. In addition, the course catalog indicates what dates a course will be offered, and gives a description of the course content, credit, and cost. Courses generally begin in September, January, and May, similar to the schedule a student would expect from a traditional semester structure.

**Getting started.** Students who sign up for college-level courses receive a copy of the *Telecourse Student Survival Handbook* for the appropriate course. The handbook explains administrative procedures, course requirements, assignment and exam procedures, grades, and other relevant information and includes a broadcast schedule with lesson numbers, dates and times. The purpose of this material is to

streamline the administrative process as much as possible so that the student's efforts go into studying and learning rather than into filling out forms and standing in lines.

Students also receive a study guide and a syllabus or letter from the instructor outlining the details of the course and covering information such as assignments and exams. If the course calls for a proctored exam (for example, all of the MBA classes require proctored exams, wherein the proctor, or individual administering the exam, must sign and have notarized a proctor statement), this information will also be included.

**Attending college-level classes.** Once the preliminaries are taken care of, students are ready to start "attending class" in their homes or offices. Classes are televised weekly. As mentioned, students usually videotape the programs and then watch them at a convenient, but regular, time each week. Most ME/U students stress that consistency of personal scheduling is important to maintain the continuity of the course and to stay on top of assignments.

Depending on the originating school's schedule, courses run for a quarter or a semester, similar to on-campus classes. Although students are encouraged to complete the courses within the regular quarter or semester schedule, it is understood that ME/U students frequently face personal and professional disruptions to their studies. Consequently, course extensions may be arranged if necessary. As with any questions regarding scheduling, classwork, or related concerns, ME/U representatives at the Student Support Center will work with students to help resolve course completion problems.

*Elementary and Secondary School Courses*

Any viewer interested in ME/U programming at the elementary or secondary school level can call a toll-free number and speak with a Student Support Center representative for information about the courses. Elementary and secondary schools wishing to use the courses to augment their curriculum with classroom-delivered telecourses available on the network may call for registration information and materials.

Interested callers may request a course catalog that describes subscriber services, staff development programs, special programs, student enrichment programs, and direct student instruction courses. The catalog includes the annual programming calendar, and information on all policies and procedures. Additionally, teachers are encouraged to call with questions they may have. Because staff members work regularly with both teachers and school districts across the country, questions can be handled quickly and knowledgeably.

*Student Support Services*

A Student Support Center is staffed at ME/Us headquarters in Englewood, Colo., to support the ME/U-affiliated colleges and universities and the administrative needs of ME/U students. Through the center, ME/U representatives assist students with enrollment (among other things), bill them for tuition and fees, mail textbooks and support materials, and arrange exams. Representatives also refer students to local schools when appropriate and provide information regarding transfer of credits.

Registered students are also provided with "missed lesson" videotape rentals. Instructor contact is maintained through a voice mail system, and, for some classes, through a computer bulletin board arrangement that allows students to discuss questions and concerns with both instructors and other students, and through periodic teleconferences with professors to review important course topics.

*The Home/Office Classroom*

One of the most exciting aspects of ME/U is that many of its students are eager to use advanced communications technologies. Reflecting the communications advances currently available to distance education, ME/U's at-home students may have in their home classrooms:

—a television connected to a cable or a satellite receive dish, either of which enables the television to receive a channel devoted entirely to education;

—a VCR, connected to the television, that allows students to record the programming required for their course(s); and

—a telephone line that enables them to communicate with other students or their instructors through a voice mail system on a toll-free number.

In a growing number of at-home ME/U classrooms, students also have computers that can connect them with their classmates and instructor through a modem (a device that connects a computer with the telephone lines for communication pur-

poses), an electronic bulletin-board, and a telephone number. It is expected that soon home fax machines may become as common as VCRs (and much less expensive), thereby giving students the ability to electronically send print material to their classmates and instructors. While greatly enhancing the delivery of ME/U course content, these tools also shorten the communication distance between instructor and student, as well as between and among students.

*Educational Enrichment Programs*

As part of its commitment to education, ME/U also telecasts educational enrichment and pre-college programs. This programming is designed to further an important ME/U goal, which is to become an educational channel that mirrors a complete educational institution. In addition to academic classes, students might receive self-improvement and recreational programming such as campus theater productions, lecture series, public debates, a tour of a bookstore with the latest and best titles, library programs, and other enrichment activities.

Mind Extension University is committed to enabling its students not only to see these activities on television but, through the innovative use of advances in communications technology, to *participate* in them in a truly interactive way. The enabling technology is close enough at hand to start planning its imaginative and effective use.

*Costs*

The increasing cost of higher education affects all Americans intending to pursue a degree or to send a child through college. As noted earlier, one of the most pressing concerns regarding higher education is the increase in the costs of attending college. Tuition costs for ME/U reflect those of its participating schools and fall midway between most public and moderately priced private institutions. Tables 1 and 2 detail the cost relationships.

TABLE 1: TWO-YEAR COLLEGES

(1989-90 Average Costs Per Semester (12 Credits))

| | Public | Private | ME/U |
|---|---|---|---|
| Tuition and fees * | $842 ($1,992) | $4,713 | $1,176 |
| Room and board | + | 3,258 | Existing costs at home |
| Books and supplies | 438 | 424 | 450 |
| Transportation | + | 423 | Existing costs at home |
| Personal | + | 832 | Existing costs at home |
| Total | + | $9,650 | $1,626 (plus costs at home) |

* Non-resident tuition and fees given in parentheses
+ Insufficient data
Source: based on figures cited in The Chronicle of Higher Education, August 16, 1989

TABLE 2: FOUR-YEAR COLLEGES

(1989-90 Average Costs Per Semester (12 Credits))

| | Public | Private | ME/U |
|---|---|---|---|
| Tuition and fees * | $1,694 ($2,684) | $8,737 | $2,520 |
| Room and board | 3,039 | 3,898 | Existing costs at home |
| Books and supplies | 454 | 459 | 450 |
| Transportation | 442 | 414 | Existing costs at home |
| Personal | 1,042 | 818 | Existing costs at home |
| Total | $6,671 ($7,661) | $14,326 | $2,970 (plus costs at home) |

* Non-resident tuition and fees given in parentheses
Source: based on figures cited in The Chronicle of Higher Education, August 16, 1989

The financial advantage ME/U students have over their on-campus counterparts is that they pay only for their education, not for school-related transportation, housing, athletic or health fees, or various other costs incurred in living away from home (see Table 3). In addition, and perhaps equally important, ME/U students realize a substantial time savings. While the rigors of success in a course are the same, ME/U students don't have to spend time away from their jobs or families as do those who attend classes on campus.

TABLE 3: COMPARISON OF COSTS, FINANCIAL AND PERSONAL AMONG COLLEGE ALTERNATIVES

| | On Campus | Commuter | ME/U |
|---|---|---|---|
| Tuition | Yes | Yes | Yes |
| Fees (student, athletic, library, other) | Yes | Yes | Yes |
| Room and board | Yes | No | No |
| Transportation | Yes | Yes | No |
| Personal | Yes | Yes | Yes |
| Books | Yes | Yes | Yes |
| Time away from job and family | Yes | Yes | No |

*Looking Forward*

Even though ME/U is often referred to as "the degree channel," its student body, in a broad sense, also includes millions of learners not formally pursuing a degree. Programming from ME/U engages the minds of these individuals simply because they have an interest in the political process, in history, in mathematics, in languages, in library information science, in the planet Earth, in the nature of the universe, in thermodynamics, in computer literary, in literature, in knowing how to write more effectively, in the general education development (GED) program, or in any of the long list of subjects offered through ME/U.

The channel is dedicated to equality of educational opportunity for everyone, regardless of his or her station in life or depth of interest in the formal educational process. The channel's philosophy is that if you watch you learn, and learning is positive. It is mind engaging; it is the antithesis of being a "couch potato."

American higher education has been a leader in the challenge to produce an informed electorate, a productive work force, and a nation prepared to adapt to change. However, changing societal and economic demands are forcing us to move beyond traditional responses.

We must embrace innovative solutions. In ME/U's case, this entails fusing the strengths of our educators' expertise and leadership with technological advances. In order to improve and enhance its service, ME/U will rely on a time-honored strategy of American business: it will learn in the marketplace from its clients, the students of ME/U, and from its partners, traditional educators.

## Unlimited Access

For centuries, colleges and universities have expected students to deliver themselves to education. Large-scale delivery of education to students is a substantial change in approach: it places the needs of the students, rather than those of the faculty, at the center of the education equation.

The ability to respond to students' needs is one of the key elements that makes ME/U so useful: it is "student-friendly," stressing convenience of coursework viewing and accessibility of instructors. As cable subscribers, ME/U students also create pressure in the marketplace to serve them well, because ME/U must answer to cable operators whose prerogative it is to carry or not carry the channel on local cable systems.

The flexibility of taking classes through ME/U is manifested in a number of ways. Students whose jobs require travel can record lessons for viewing later. As mentioned earlier, students who miss a session can receive a videotape of the missed program. Students who must relocate can often continue their coursework with little, if any, disruption in their degree program if ME/U is available at their new location.

At the elementary through secondary school level, the network allows parents who are at home during the day and whose cable systems carry ME/U to see how their children are doing in class. By watching the class presentation and becoming familiar with class materials and homework requirements, parents are able to more fully support their children's academic efforts. This kind of participation enables parents to play an important role in the educational equation.

The variety of students served by ME/U reflects the diversity of programming that marks ME/U's approach to education. At the beginning, the main focus was college-level courses, at the associate's, bachelor's, and master's level, in a variety of curriculum areas. However, as the network has continued to evolve, the focus has broadened to include programs aimed at students needing to complete their high school studies, improve their English, mathematics, science or language skills, or de-

velop a better understanding of the world around them. The concept underlying ME/U's programming is not just to provide an opportunity to complete high school requirements or college credits. It is also to create excitement about education and to facilitate lifelong learning in a constantly changing society.

The diversity of ME/U courses makes them valuable to a wide range of age and interest groups. In fact, any cable television system that carries the ME/U channel or any television set connected to a satellite receive dish can deliver education to students, either individually or in groups.

*Full- or Part-Time Employees*

Many nontraditional students must support themselves and their families while pursuing a college education. These students need flexible scheduling that will enable them to undertake college coursework without disrupting their job responsibilities.

Night classes or print-based correspondence courses have often been the only option available to this type of student. Night classes, however, frequently necessitate child care arrangements and being out late at night. Mind Extension University provides an alternative means of pursuing a diploma or college degree, an alternative that offers convenience, flexible scheduling, and the comfort of one's own home.

*Homebound Parents*

Homebound parents are individuals who are currently staying at home to raise young children. Their schedules are primarily geared to the needs and activities of their children.

Many of these parents, however, view their at-home child-rearing time as part of an overall family/career approach that entails spending several years at home with young ones and then re-entering the job market. Mind Extension University offers these individuals an opportunity to upgrade their educational achievements and professional skills while they are at home. Coursework and studies can be arranged around the children's daily routines, avoiding the need for child care and the inevitable scheduling conflicts that would result from trying to attend on-campus classes.

*Physically Challenged Men and Women*

For America's physically challenged men and women, a key component of living a productive life is equality of access: access to public transportation and buildings, access to job opportunities, access to education. However, for many wheelchair-bound and other physically challenged students, such access is an impossibility.

Mind Extension University offers a practical means of achieving barrier-free access to education. Because learning takes place in the student's home, ME/U students are able to attend classes and study in an environment tailored to their particular needs. As a society, we have a long way to go before we can offer a truly barrier-free environment, but ME/U represents a positive first step for many physically challenged students.

*Shift Workers*

Like other students who are employed part-time or full-time, shift workers must dovetail their college coursework with the scheduling demands of their jobs. Shift workers, however, often have to cope with the added disadvantage of schedules that change frequently or require unusual amounts of time per shift. For example, firefighters may work 4 days and have 3 days off during 1 week, then alternate the schedule the following week.

This type of work schedule makes attending most on-campus classes impossible. The flexible scheduling provided by ME/U classes, however, offers an effective means for combining shift work with pursuit of continuing education or a college degree.

*Geographically Remote Individuals*

Americans living in geographically remote locations are often unable to travel the distance to the nearest college campus, and that campus may not offer the curriculum they need. Individuals in these situations are unable to pursue further education in order to change occupations or to enhance their current job skills. As the number of family farms continues to decrease, for example, more and more rural workers need to explore other industries and job options. Distance education can offer them an opportunity to complete their education or to upgrade their skills as they contemplate such a transition.

*Military Personnel*

One of the benefits of a military career is that the government helps to pay for its employees' educations. The drawback, however, is that military personnel are often moved about so frequently that it becomes impossible for them to complete many college-level courses, let alone a degree program.

Mind Extension University is able to overcome the difficulties caused by relocation because it is available by cable or satellite throughout the United States and at various overseas locations. Thus, it enables military personnel to earn college degrees, upgrade their rank, or simply pursue intellectual interests.

Individuals who have spent their professional lives in the military but are contemplating a second career upon completion of their service can use ME/U to get a head start toward their goals. The education available through ME/U can help them prepare to compete in the work environment they have chosen.

*Seniors*

In *The Three Boxes of Life*, author Richard Bolles observes that traditionally we have organized our lives according to three periods or "boxes": getting an education, going to work and earning a living, and living in retirement. Arguing that this "boxed-in" approach to life is at best limiting and at worst damaging, Bolles calls instead for a lifelong flow that incorporates all three elements concurrently to achieve a balanced, dynamic and productive life.

Today's seniors are breaking out of the retirement box with energy and enthusiasm, and they're finding lifelong learning to be one of their most powerful allies. In 1987, 1 in 10 college students was over 50. The success of the Elderhostel program, a nationally offered, campus-based program of courses for seniors, clearly demonstrates the increasing interest of seniors in lifelong learning. According to Annette Buchanan, American Association of Retired Persons (AARP) program specialist for consumer affairs, [Elderhostel] started in 1975 with only 200 students enrolled at 5 colleges in New Hampshire. In 1987, just 12 years later, Elderhostel enrolled 150,000 students in 850 colleges in the U.S., as well as 200 institutions overseas located in 37 countries. Elderhostel has never done any marketing or paid for an advertisement. Yet, this year alone, Elderhostel had more than 150,000 unsolicited requests for catalogs beyond the normal mailing list sent to former attendees. According to Elderhostel president, Bill Berkeley, they cannot keep abreast with the demand and cannot find sufficient space for new Elderhostel programs.

Senior students are looking for personal enrichment, intellectual challenge, and increasingly, upgrading of professional skills. Yet, according to Buchanan, they also want "classes during the day with easy accessibility, since walking long distances can be difficult," and because parking problems often become yet another deterrent to class attendance on campus. The convenience, comfort, and safety of learning in their own homes offers many seniors educational opportunities they might otherwise miss.

*Prison Inmates*

Another potential user group is prison inmates. As noted by Bruce Wolford in his chapter on correctional facilities in *The Handbook of Adult and Continuing Education*, "In many correctional institutions, educators provide one of the few positive change-oriented programs available to inmates." Wolford also notes that our prisons include "a disproportionate number of unemployed, undereducated, and learning handicapped individuals," that more than 80 percent of these prisoners did not complete high school, and that "60 to 80 percent have been classified as functionally illiterate."

This is a disaster both for the prisoners who are unable to break out of their destructive lifestyles and for our society, which bears the scars of their ongoing crimes. Education is one of the tools that can check this downward spiral. Yet for obvious reasons, few inmates have the opportunity to attend classes.

Many prisoners know firsthand the difficulties they will confront in attempting to rejoin society if they have not developed the skills necessary to compete in the work force. Consequently, although prison inmates frequently need substantial remedial education (ME/U's GED coursework can be especially helpful for prisoners who never completed high school), those who take advantage of educational opportunities are usually quite motivated and committed to completing their programs.

Although changing criminal behavior patterns is one of society's most perplexing challenges, the experts identify educational opportunities as a key component in prison reform. Learning creates understanding, opportunity and hope; these displace anger.

*Colleges and Universities*

The escalating costs of hiring professors in certain fields may seriously impair the ability of all but major institutions to offer students a well-rounded curriculum. Courses offered through ME/U can help provide a solution to this growing problem. Colleges and universities can use ME/U's satellite-delivered programming as on-campus stand-alone courses or as a component of the institution's division of continuing education. In the former instance, the school supplies its own catalog number and instructor and offers its own credit. In "wrap-around" courses, instructors begin and conclude the class with their own material, wrapping it around the televised material that forms the core of the course. In the latter instance, ME/U programming is usually offered through the school's division of continuing education as a telecourse for individuals in the local community, who, because of scheduling or logistics conflicts, would otherwise be unable to attend the school's on-campus classes.

With either method ME/U saves the institution's instructors time and effort in preparation and allows the instructors to see how colleagues cover the course material. Institutions may also find that offering ME/U programming through the division of continuing education enables them to enroll more students.

*Elementary and Secondary Schools*

Elementary and secondary schools, especially those constrained by geographic isolation, funding limitations, or teacher shortages, are one of ME/U's largest constituencies. ME/U programming enables these schools to:

—provide access to courses for which they have no teachers;

—offer graduate courses and in-service programs for teachers, administrators, school librarians, and school support staff;

—enhance or broaden the curriculum they are already delivering to their students; and

—offer academically advanced students a head start on college coursework (many entry-level college courses have study guides and textbooks designed for high school use).

In the future, ME/U plans to offer schools the opportunity to participate in innovative, single-event programs. As communications advances have opened up new interactive possibilities, single-event programs have become a popular way to introduce students to the excitement of exploration and discovery, be it in the sciences, literature, the arts, or simply the exchange of ideas. Although single-event programs may originate from many different sources (research institutes, museums, national forums, professional associations, art galleries, and national libraries are but a few), they have in common the goal of providing opportunities for students to participate in specialized learning experiences or events that would otherwise be unavailable to them.

*Business and Industry*

Business and industry comprise another constituency for ME/U's educational programming. America's blue-collar work force is currently made up of some 32 million men and women. Many of these individuals lack an adequate pre-college education and may need to take GED courses, preferably at the work site. Moreover, although in the past a high school education was sufficient to enable blue-collar workers to perform their jobs successfully, today a bachelor's degree is more frequently necessary to compete in the labor market. Additionally, a growing number of professions require a master's degree either to start in the profession or to remain in it. Many companies insist that their employees complete such degrees within 2 or 3 years of employment or face termination.

Although the demand for further education for American workers has increased radically over the past decade, there has not been a similar increase in educational alternatives for this group. Many full-time workers do not have the option to attend traditionally scheduled, on-campus classes; as already noted, shift workers in particular find it difficult to continue their education in any traditional way.

For students who need to continue working while completing their high school education, upgrading their skills, or preparing for a career change, ME/U offers a way to pursue their education while maintaining their employment.

## Specialized Degree Programs

*Completion Program*

Many of the potential students just described may have started higher education programs but for various reasons were unable to continue them. To meet the needs

of these students, ME/U delivers an associate degree and a bachelors' completion degree with a management focus.

The associate's degree is based on a general curriculum so that courses will easily transfer into the bachelor's degree programs of other colleges and universities.

The bachelor's completion program, designed for adult students who wish to sharpen existing management skills or learn new ones, allows students to supplement its management focus with a secondary concentration that supports their career goals. The degree's business curriculum focuses on current issues (including global perspectives), ethical and legal considerations, practical problem solving, and critical thinking.

Structured for maximum flexibility, the program accepts credit for work experience as well as a wide variety of school transfer credits, so that students from diverse academic backgrounds need not lose credit for the coursework they have already completed.

*Master's Library and Information Science*

Library and information science is an exciting component of ME/U programming. With existing library and information science courses from the University of South Carolina forming the basis of this ME/U degree program, additional course work is being developed.

Mind Extension University is working with a consortium of several institutions that have graduate-level library and information science programs to develop a master's degree curriculum comprising courses drawn from the participating schools. The goals of the consortium are to (1) develop a library science master's program accessible to students who cannot attend on-campus classes, and (2) allow consortium schools an opportunity to offer courses to their on-campus students that the individual schools might not otherwise be able to provide.

Undertaken with the support and advisement of the American Library Association, this consortium is breaking ground in the innovative use of teaching technology. Few graduate programs, library science or otherwise, have the faculty and resources to offer all the courses that might be desirable in a given discipline. Combined with a consortium approach, however, ME/U's telecourse technology enables schools to share faculty with one another, expanding the reach and services of each institution.

Consortium members will agree on a curriculum and on which institutional members will teach each course. Participants will also agree to transfer credits from other member institutions. This inter-institutional cooperation will allow students to benefit from the broad-based strengths of several schools rather than being restricted to the offerings of just one. Students enrolled in an existing on-campus program will be able to take consortium courses in addition to their regular classes; students in remote locations will be able to complete all coursework through the ME/U programming.

The consortium model for graduate education is also being adapted for use in a master's level teacher-education program. The focus here will be twofold: (1) to maximize the effective use of each institution's graduate program resources, and (2) to assist in preparing teachers to meet the Professional Teaching Standards, a teacher-certification method that may become a requirement for teaching in the near future.

*Master's Level Teacher Education*

The current move toward new teacher-certification rules will have a tremendous impact on existing teachers as well as on future professionals. Some states are abolishing the undergraduate education major at their colleges and universities and instead are requiring prospective teachers to focus on the subjects they will one day teach. The new rules require teachers to hold a master's degree to receive permanent certification. This will likely cause an increasing demand for telecourses as attempts are made to get quality information to a large, dispersed audience in a reasonably short period of time. In the meantime, ME/U is working with Penn State and other institutions to offer high-quality in-service training for the nation's teachers and other education staff.

*Master's Business Administration*

To date, the most sought-after coursework among ME/U students and corporate clients has been graduate-level business classes. In response to this need, ME/U now carries the coursework for the Master's of Business Administration from Colorado State University. The degree coursework carried on the ME/U cable channel is also available by satellite reception and by videotape. In addition to the MBA coursework, ME/U will also offer business school short courses from Colorado State.

The first and only MBA degree program delivered nationally on cable television and by satellite broadcast, Colorado State's MBA program is accredited by the American Assembly of Collegiate Schools of Business (AACSB). (Of the 750 business degree programs currently available in the United States, only 266 have met AACSB accreditation standards.) The Colorado State College of Business, which has been providing business education for more than 25 years, has a faculty that combines excellent academic credentials with strong business experience. More than 90 percent of the regular business faculty hold doctoral degrees, and more than 50 percent have had significant business experience with major corporations.

Graduate courses are scheduled throughout the year, and the MBA degree may be completed through ME/U in as few as 3 years. As with other ME/U degree programs, students enroll in courses through ME/U and receive credit from the sponsoring institution, in this case Colorado State.

The MBA program focuses on preparation for a broad-based, general management career and is designed primarily, but not exclusively, for students with nonbusiness undergraduate degrees. Theoretical approaches are blended with the practical application of decision-making in today's business world. The program offers a wide range of courses such as finance, marketing, organizational structure, and information systems.

This degree, with its flexible scheduling and ability to address the student's needs, will be especially useful to lower level managers who want to upgrade their professional options without disrupting their employment schedules, to individuals (such as career military personnel) who would like to augment their technical degrees with a broader, management-oriented graduate degree but live in geographically remote areas or face relocation, and to others simply trying to keep their professional skills current with changes in the employment marketplace.

To qualify for the MBA degree, students must have the equivalent of a "common body of knowledge" in business and administration as defined by the AACSB. This body of knowledge, which can be acquired either at the undergraduate or graduate level, includes satisfactory work in basic economics, mathematics and statistics, accounting, finance, management and human resources, marketing, production and operations management, computer-based information systems, and business policy. The 30-credit hours that comprise the Common Body of Knowledge Program can be taken from Colorado State or ME/U or can be transferred from another accredited college.

Once students have completed a series of courses designed to bring them to this common point of preparation and have been accepted into the Colorado State graduate program, they are then ready to begin the College of Business's Professional Graduate Program. Of the 33 credit hours that make up the Professional Graduate Program, at least 27 must be from Colorado State.

The program draws on Colorado State's 20 years of experience with televised instruction to offer course material that is both innovative and practical.

[41 Tuition for this degree program, based on 33 credit hours, falls midway between that of other public and private college and university MBA programs.

TABLE 4: MBA PROGRAMS

[1989-90 Average Costs Per Semester (12 Credits)]

| | Public | Private | ME/U |
|---|---|---|---|
| Tuition and fees * | $1,564 ($2,973) | $5,202 | $3,600 |
| Room and board | + 2,092 | 2,092 | Existing costs at home |
| Books and supplies | 331 | 450 | 425 |
| Transportation | 400 | 400 | Existing costs at home |
| Personal | 1,913 | 1,913 | Existing costs at home |
| Total | $6,300 ($7,709) | $10,057 | $4,025 (plus costs at home) |

* Non-resident tuition and fees given in parentheses.

Source: based on figures cited in Official Guide to MBA Programs, 1988-89 Edition, Educational Testing Service.
Transportation figures based on average costs cited in higher education publications.

When room and board, transportation, and personal costs are added in, the savings realized by ME/U students are substantial.

## Mind Extension University Students

Students enrolled in Mind Extension University courses represent diverse backgrounds, a broad range of ages, and widely varied goals. Many are striving to enhance their career opportunities or to attain other personal and professional objectives. Some audit courses simply out of curiosity or a commitment to lifelong learning. All, however, cite ME/U's ability to bring the classroom to the student as central to pursuit of their studies. The following profiles of 8 ME/U students illustrate the advantages ME/U offers individuals in a variety of circumstances.

*Steve Zullo, Full-Time Teacher, Libertyville, Illinois*

Many individuals who have full-time jobs in demanding occupations credit ME/Us flexible scheduling with enabling them to pursue professional certification. Such was the case for school psychologist Steve Zullo.

Along with two colleagues who teach high school students with behavioral disorders, Zullo took 3 education classes during the summer of 1988 to continue his certification. Married and the father of two children, 41-year-old Zullo noted that between teaching and coaching, he and his two friends were extremely busy and that "cable TV allowed us to videotape the class and then view it when we had the time. This way we could also do the homework as time permitted. I could work on the classes at night when my children were busy. Or sometimes when everyone else was in bed asleep, I turned on the videotape and started working on my homework."

Zullo and his friends, Robert Mueller and Howard Litwin, teach in Des Plaines, Ill. Because Zullo's local cable company carries ME/U programming, he was the resource for the group. "The others can't get ME/U where they live, so I videotaped the courses on my recorder, did my assignments on Monday, and passed the tape on to Bob or Howard. Then they passed it on to the other guy." When they enrolled, the 3 men were assigned a Colorado State University professor with whom they were in regular contact. They sent assignments in weekly and consulted with their professor by telephone or mail. On completion of their courses, they received credit from Colorado State.

*Robin Pappas, Home-Bound Parent, Lodi, Ohio*

Few people experience a more demanding full-time occupation than stay-at-home parents of small children. Yet while raising their children, many parents want to continue their education. For some, this phase of their lives can offer a chance to upgrade or reinforce important professional skills while they take time off from their careers to care for their children. For many, it can be an opportunity to catch up on courses they never had a chance to take during their college years. For others, it may be an opportunity to begin an undergraduate degree for the first time, as it was for Robin Pappas.

An Ohio mother of 3 small children, Pappas had never had the opportunity to attend college. Once she became a mother, her family responsibilities and busy lifestyle made attending on-campus classes nearly impossible for her. Pappas faced an urgent problem, however: with no college background or work experience in accounting, she needed training that would enable her to manage the family business.

In the spring of 1988, in the privacy of her living room, Robin Pappas went back to school for the first time in 20 years. Mind Extension University's "Accounting I," offered by the University of New Mexico, provided the introductory accounting coursework she had been looking for. "I wanted to take some business courses so I could help my husband in his business. He drives a semi-trailer truck and also has a home picnic table business and needed me to handle the bookkeeping for both," explained Pappas. After completing the accounting coursework, she set up and continues to maintain official ledgers for both businesses. Pappas subsequently enrolled in the University of Minnesota's "Introduction to Technical and Business Communications" course and in Oxnard College's marketing course. She is currently enrolled in "Introduction to Geology" offered by Colorado State.

With the nearest college 20 miles away and a husband who travels, Pappas found that ME/U's flexibility was the key to her success. "For a mother with small children, this is ideal," she noted. "I tape the classes on my VCR and set aside an hour from 7 to 8 a.m. every day, when I have quiet time to study. I like the independent study because it lets me fit the classes into my schedule. The advice I would give to others is to stay motivated and discipline yourself to set aside time each day for studying."

*Martin Shepard, U.S. Marine, Alexandria, Virginia*

Staying motivated and ME/U's scheduling flexibility were what finally enabled Martin Shepard, 34, to complete his undergraduate degree and to reach an impor-

tant professional goal. Shepard had been an enlisted man in the Marines for 13 years, but was unable to qualify for commissioned officer status until he had earned an undergraduate degree. With only one humanities course left to complete, Shepard found his military schedule in constant conflict with local college and university offerings.

The young Marine had progressed as far as his junior year while studying for a degree in health care management at George Mason University in Fairfax, Va. After a brief interim, he resumed his studies through an off-campus degree program offered by Southern Illinois University at the military base in Bethesda, Md. Instructors came to the base every weekend for 16 months. Shepard attended classes and finished a course every 6 weeks. When all that remained for Shepard to complete his undergraduate degree was a single humanities course, he was working full-time and the course he needed wasn't offered during the evening at local colleges.

"It was at that time that I found ME/U," said Shepard. "ME/U had sent information about its program to Southern Illinois University. The university evaluated it and said it was a good program." The course, "Humanities through the Arts," was offered through ME/U by Colorado State University. It focused on how humans express themselves through the arts and included segments on art, music, cinema, architecture and literature. "I videotaped the program and watched it whenever I could," continued Shepard. "It was a great way to take the course."

Shepard claims his relationship with his Colorado-based instructor added to the learning experience. "Even though it was a long-distance relationship through correspondence and telephone calls, the student-teacher contact added a lot to the course. If you're not in class, you want to make sure you're not missing something. The instructor sent her biography and a photograph. We got to know each other during the class."

Shepard finally received his Bachelor of Science degree in health care management from Southern Illinois University in 1989 and was able to graduate with his class at Bethesda. "I was enlisted for 13 years," said Shepard, "but it's because of the degree that I got my commissioned officer status, Ensign."

*Twyla Hall, Physically Challenged Student, Woodleaf, North Carolina*

Twyla Hall, 30, has been equally tenacious in overcoming obstacles in her pursuit of an undergraduate degree.

Hall was born with a physical disability that severely restricts her ability to move about. Nevertheless, she was able to attend public school in Woodleaf, NC., with the encouragement and logistical support of her parents. With the school's approval, her father constructed ramps and rails at the school to facilitate the use of a series of carts he had built so she could be pushed to her classes. By 1978, Hall had graduated with the rest of her high school class and was college bound.

The determined young woman had always planned to attend St. Andrews Presbyterian College in the nearby town of Laurinberg, the only college in the area with special facilities for the handicapped. Although she was accepted into the college, no dormitory space was available for her because so many other physically disabled students had applied. Hall decided to consider other colleges.

The University of North Carolina at Greensboro (UNCG) was her second choice; she enrolled, with a major in biology. Hall used an electric golf cart to get to and from classrooms, but the campus was large and she often had to be pushed home from classes. In addition, a multitude of stairs that daily confronted her took a long time to climb and frequently exhausted her.

"Steps were really a big hassle for me. I couldn't take a full academic load because I had to consider the time between classes. Once I had a science class on the fourth floor. After each day of that class, I was beat. At this regular college, I always felt as though I wasn't equal to the other students. I couldn't apply my best effort in class because I was always tired from climbing steps all day. Walking on crutches is a strenuous activity. The first week at UNCG I dropped 20 pounds. I had never seen so many steps."

The process of maneuvering between dorm and classroom finally became too much of a physical and logistics burden. As a first-semester junior, Hall withdrew from college, extremely upset by being unable to finish. "I left not knowing what else to do," she explained. "I hated that I couldn't finish my degree. It had been my lifetime dream to graduate from college." She tried attending classes at a local private college, but the school was not designed to handle the needs of handicapped students. Although she enjoyed her coursework, Hall eventually withdrew from this school, too.

Shortly thereafter, Hall was watching a satellite-delivered program on the family television when she happened across a classroom-like program. The man on screen,

a professor, was discussing Einstein's theory of relativity. The course, being delivered by ME/U, was provided by Washington State University in Pullman. Hall contacted ME/U and enrolled in her first telecourse. She chose statistics, which she felt would aid her in her work as an insurance clerk in the family business.

Hall has now completed math and conversational Spanish classes in addition to her statistics coursework and plans to complete her degree. Hall noted that her professors "make you feel like you're part of a class. If you have a problem, they give you an 800 number to call. It's not a big deal to pop a tape in. It's meant a lot to me and to my parents. It's an unconventional way to go to college, but I feel very fortunate that I found ME/U. It was the only way I could do it."

A senior now, Hall and her parents plan to drive to Ohio State University for graduation so she can receive her diploma on campus. "We have a saying in our family: 'a winner never quits and a quitter never wins.' My mother always encourages me to finish whatever I start. She insists that I never give up because things look rough for me. That just isn't something we Halls do."

*Kelly Metzenbacher, MBA Student, Baton Rouge, Louisiana*

Kelly Metzenbacher, a 29-year-old account manager with Xerox Corporation in Baton Rouge, LA, had already completed his undergraduate degree and was trying to find a way to fit MBA coursework into his busy schedule, a way that didn't necessitate regular on-campus class attendance. Metzenbacher became one of the first students to enroll in the MBA degree program offered by Colorado State University on Mind Extension University.

Metzenbacher had previously enrolled in an MBA program at Louisiana State University in Baton Rouge, but was unable to complete his studies because, as he points out, "My schedule didn't coincide with theirs." The ME/U program appealed to him "because it was flexible. Xerox and other corporations value the MBA, and this is a rare opportunity for me to get it." Married and the father of 2 young children, Metzenbacher studies weekends and early in the morning.

A main consideration for Metzenbacher was the tendency of large corporations to move their employees to various locations throughout the country. By studying for an MBA via cable television, Metzenbacher explains, he won't have to worry about being transferred and, in the process, losing credit hours. "I feel a bit like a guinea pig," he said. "Everyone, including my co-workers at Xerox, is interested in this new way to pursue MBA studies. It's a new concept."

Like Metzenbacher, other MBA students at ME/U and those considering enrolling cite flexibility and scheduling as factors that attract them to the program. Larry Forness, 45, a management, tax and financial consultant from Denver, Colo., is considering getting his MBA via cable for these 2 reasons. "I know I won't be able to go onsite or take courses at night. I wouldn't be able to commit to specific class times. Given my demanding schedule, I need a flexible day-by-day, week-by-week program so I can do coursework whenever I have free time. You can't do that In a campus setting."

*Carolyn Sharp, Lifelong Learner, Norwood, Colorado*

Carolyn Sharp has plenty of free time, but no nearby campus at which to attend classes. Although she loves living in small, rural Norwood, Colo., it's 150 miles away from the nearest city, Grand Junction. Life in Norwood can be isolating, says 71-year-old Sharp, who doesn't drive and lives too far out in the country to receive radio or broadcast television signals. Reflecting on the beauty and peacefulness of her surroundings, Sharp notes, "The only thing I lack here is intellectual stimulation."

Things changed, however, when Sharp's sister gave her a satellite dish. Her new television was able to receive a host of satellite-delivered programming, including ME/U. In 1988, she recalls, "I had already been boning up, doing some history research on my own, and I wanted to take a class. I took 'Humanities Through the Arts,' and it was a wonderful experience."

The course was especially interesting to Sharp, who had studied art in college and worked as a portrait painter until failing eyesight led her to writing. Mind Extension University's art course also helped Sharp with an ongoing project she's working on: a chronological (rather than alphabetical) arrangement of the encyclopedia as part of a new way to organize history. Explains Sharp, "The course pulled together everything I've learned in my 71 years. It corroborated what I believed, that the arts—theater, painting, sculpture—are the way we learn about history."

Like many long-distance students, Sharp corresponded with her professor by mail and phone. They developed an excellent rapport, and her instructor even took an interest in her extracurricular work, reviewing parts of Sharp's encyclopedia. "The teaching and class presentations were like nothing I'd ever seen," recalls Sharp.

"The visual effects were wonderful: you saw it, felt it, and heard it. It was so different from just reading a book." Sharp even became something of a celebrity, when Colorado State University sent a television crew to interview her about her work.

Although Sharp originally considered finishing her undergraduate degree through ME/U, she abandoned the idea because she felt it would take too long. She is currently auditing an ME/U French language class, however, as well as courses in history and physics, and she plans to continue pursuing her love of learning and understanding.

*Mico Perales, MIT Student, Nordheim, Texas*

Mico Perales is now a sophomore electrical engineering student on full scholarship at the Massachusetts Institute of Technology (MIT) in Cambridge, Mass. However, not long ago he was a high school student in the tiny South Texas town of Nordheim, population 369, wondering if he would ever be able to achieve his dream of becoming an engineer.

Like many other small rural towns, Nordheim had difficulty finding teachers qualified to teach basic courses and willing to relocate to its geographically remote area. Finding teachers who could lead the advanced science and math classes required for Perales to compete for a spot at MIT seemed nearly impossible. However, his high school was able to support the young man's academic goals by using telecourses to provide an advanced curriculum of science, math, and foreign languages. In his junior and senior years, Perales took 5 TI-IN classes, ranking as the top student nationally in 2 of them.

Perales credits his advanced science and math telecourses—courses that many small rural schools find difficult to offer—with providing the background he needed for acceptance to MIT. According to this bright engineering student, distance learning allowed him to develop intellectual skills commensurate with those of students from across the nation. Now he is pursuing his dreams of a degree in electrical engineering and a profession in the field of robotics.

*Jeremy Dilbeck, High School Student, Murphy, North Carolina*

Murphy, North Carolina, a small community in the extreme western corner of the state, has only 400 students in its kindergarten-through-high-school school system. And yet, as Hiwassee Dam High School sophomore Jeremy Dilbeck found, the school system made a commitment to not let its small size compromise the quality of education available to its students. Once limited by a narrow school curriculum, the high school decided to offer gifted students like Dilbeck advanced courses such as trigonometry, calculus, marine science, Latin, and Japanese via distance learning.

By taking part in many of TI-IN's academically advanced courses, Dilbeck was able to win a statewide competition for a summer scholarship to study social science at the Governor's School, a summer residential program for gifted students from throughout the state.

After completing the program, Dilbeck went on to the North Carolina School of Science and Math in Durham, a 2-year accelerated high school for high academic achievers. Passing tough entrance exams and personal interviews, Dilbeck received a scholarship from the school, and will live on campus for his junior and senior years.

This gifted young man plans to go on to college after completing his studies at the School of Science and Math. Although still undecided as to what area of expertise he will choose to pursue, Dilbeck is certain of one thing: distance education made possible many of the options he is currently considering.

## Telecourses and Educators

The role of ME/U in education is to augment, not supplant, traditional education systems. Schools, colleges, and universities offer on-site students a rich, communal learning experience unsurpassed by any other educational configuration. Mind Extension University's goal is to generate interest and excitement about education generally and to encourage its pursuit on both an individual and broad scale basis.

In order to create an alternative means for delivering education to students, we have created an electronic pipeline for learning. This pipeline will enable America's schools to extend their resources beyond the campus-bound classroom, to offer educational opportunity where previously none existed. Simultaneously, it allows students to reach out and receive education resources from beyond their classrooms.

As part of its ongoing effort to support local educational institutions, ME/U has established the Student Registrar Referral Program. This program informs potential students (who have called ME/U for information about its courses) about other edu-

cational programs offered by their local colleges and universities. The Student Registrar Referral Program generates thousands of referrals of potential students to local colleges and universities, thus supporting the region's educational institutions. Rather than competing with local schools, ME/U's role is to complement them by delivering otherwise unavailable course materials to them and by providing educational opportunity for students who would otherwise have none. The purpose of ME/U is to deliver education to students for whom access to traditional educational structures is either difficult or impossible.

## Educators' Concerns

Distance education has been proving itself as a viable learning technology for years in America and in such geographically remote areas as South Australia and northwestern Canada. Nevertheless, many academicians resist accepting telecourses as a teaching tool. Often this resistance stems from past experiences with early televised educational experiments or lack of awareness about advances in telecourse instructional design and production.

In recent years numerous studies have compared the academic performance of telecourse students with that of in-class students. Although the results of these studies should not be considered definitive, the preliminary data comparing telecourse students with in-class students indicate that "no significant difference" exists between the performance of the 2.

Chicago's Citywide College has undertaken several studies to test the effectiveness of telecourses. Its research, experimentally controlled and conducted by distinguished educators from across the country, has demonstrated that home-based students tend to equal or surpass the performance of their on-campus counterparts of comparable age and ability.

These and other studies have shown that a motivated, committed student will learn as well through one delivery medium as through another, provided the course and delivery are well designed and executed. In fact, over the years telecourses have been placed under the academic curriculum committee's microscope far more often then any customary on-campus course. If telecourses had not passed critical academic review, they would not be around today, much less growing in use.

Human nature being what it is, teachers, like the rest of us, embrace change cautiously and with a healthy amount of skepticism. In this context, it might be helpful to remember that when computers were introduced in the work place, many individuals feared they would be replaced by the new machines. On the contrary, today's office workers find that their skills, rather than being *replaced* by technology, have been *extended* by it. Computers are now relied on as tools that enable workers to reach higher levels of productivity and effectiveness. Telecourses can play the same role in the educational arena: extending the reach of our teachers, raising their productivity, increasing their effectiveness.

### *Telecourses as a Teaching Tool*

Many teachers have difficulty acknowledging that a telecourse in which the student views faculty-delivered instruction at a distance can be as effective as instruction in a traditional classroom setting where the instructor and students interact face-to-face.

As noted previously, distance education evaluations performed over the past 10 years have consistently documented the effectiveness of telecourse learning experience. Therefore, although the approach to instruction has traditionally been "point to point," in which the instructor speaks with students face-to-face, it is now necessary to supplement this approach with a "point to multipoint" system (which is classic cable-television system architecture). In this situation, the instructor may still be in the front of the classroom, but students can number in the millions and can be anywhere in the world.

Expanding the reach of our teachers will continue to be one of distance education's most important goals, for there are too many people today who cannot be present in the classroom where instruction is being delivered and too many students in schools where the necessary teachers do not exist. Therefore, teaching must become accessible from a distance; we can no longer be constrained by walls or by teachers' locations.

### *Authorship*

Another source of resistance to telecourse teaching is the "not developed here" or "not developed by me" response. Even though many telecourses rely on advisory boards that include peer reviewers and experts on the course's content, many people in the academic community are still reluctant to use someone else's materials. This

is understandable; most instructors are initially most comfortable using their own material and presentation style.

Some instructors have overcome this hesitation to accept telecourses developed by others by adding their own video segments, called "wraparounds," to the existing package. Other instructors, realizing that they use textbooks developed by others and add their own supplemental material, feel that the criteria for using someone else's video material should be similar to that for using someone else's print material: if the academic quality is strong, the material can be useful. This makes the acceptance decision an issue of quality, rather than authorship.

*Quality of Course Design*

There is sometimes concern about the quality of instruction in today's telecourses among teachers who remember the early, "talking head" televised classes. Initial experiments with televised classes used a single, fixed camera aimed at the front of the classroom. Viewers lost sight of instructors who moved out of the camera's range and could see only the backs of the students in the classroom. It was often difficult for viewers to see clearly what was written on the chalkboard.

The basic problem with these early telecourse efforts was that the instructor focused on those in the classroom and ignored the needs of the distant student. Fortunately, advances in telecourse design have addressed these issues. Whereas early telecourse faculty typically had only themselves and occasional graduate students to rely on for design creativity and expertise, today's well-designed teleclasses incorporate the work of several skilled people, such as instructional designers, educational technologists, and television production specialists.

Today's telecourse instructors have learned to speak to distant students as though they were present in the classroom, and are better prepared to address their distance learners' needs through such aids as study guides to bridge the video and text material. Technological advances such as phone-mail systems and computer bulletin boards have been especially useful in facilitating student-teacher communication.

*Student-Teacher Interaction*

In distance education, students often receive information in a time-delayed manner rather than in "real time." Some teachers object to this delay because of the resulting loss of spontaneous feedback from the distance learner. While it is true that some immediate interaction may be sacrificed with telecourse, most distance learners cite the benefits of taped instruction as greatly outweighing the drawback of lack of spontaneity.

Videotaping teleclasses, the most common method of time-delayed delivery of instruction, has proved to be an effective way for distant students to review a concept for better understanding or to review selected material. It is especially helpful in alleviating students' concerns about whether they caught all the important points in their notes; the lesson will always be there for them on videotape.

Flexible scheduling is less of an issue for telecourses delivered to elementary and secondary schools. These courses, which can also be videotaped, offer instead the benefits of live, interactive presentation. Consequently, the full array of advanced communications technologies can be deployed to provide a dramatic and participatory educational experience.

*"Hands-on" Learning Situations*

Some academics have questioned the across-the-board applicability of telecourse learning. Certain course materials lend themselves to distance learning using today's technology better than others. For example, there is currently no technology that would enable distance students to take the laboratory component of courses for which they are required to have "hands-on" experience. Several solutions are under consideration to address this issue. For example, an alternative now being explored is the use of facilities at other institutions, which would involve setting up a network of lab sites where students could go to finish the required work and to gain the hands-on experience necessary to understand the material.

*Library Support*

Mastery of any subject includes the ability to navigate easily among the subject's reference works and major information resources, be they published, on-line through computer databases, or available in some other format. This skill, called "information literacy,"is central to subject research and informed analysis (as well as increasingly important in day-to-day living). Only when students understand how to use a subject's range of information resources are they able to move beyond the structured distillations of textbooks into the wealth of free-flowing ideas available in such resources as conference proceedings, master's and doctoral theses, association


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findings, industry analyses and journal reports. We agree strongly with educators that information literacy is central to the dialogue of learning. Alvin Toffler noted it in *Future Shock* 20 years ago in his statement, "Tomorrow's illiterate will not be the man who can't read; he will be the man who has not learned how to learn."

On-campus students can explore these resources in their college or university libraries. For many distance education students, however, the most convenient research facility is a local public or community college library. Although these libraries may possess far fewer resources than standard academic libraries, they are usually able to provide guidance on the resources for a given subject and to obtain most of the materials needed through interlibrary loan.

Too many distance education students, however, face either an underfunded local library with few materials appropriate to their studies, or no library whatsoever. Physically challenged students may find library buildings as much like obstacle courses as local campuses.

Although we have achieved the goal of taking the teacher to the student, we are still working on the challenge of delivering the library's supporting resources into the home, school, and workplace. ME/U is currently working with the library community to help resolve this issue and is pursuing ways to make significant library resources available to the students ME/U serves.

## Making the Transition

As more teachers use the techniques of telecourse education, they will devise their own solutions to the problems of distance education. Today's schools, in fact, are increasingly investing in the technologies that will deliver greater learning opportunities to their students. According to results published by the education research group Quality Education Data (QED) in their recent survey, 1990–91 *Educational Technology Trends*, 26 percent of the 1,262 U.S. school districts surveyed are currently using some form of distance education (an 18 percent increase from last year), and 57 percent of respondents planned to be using it by 1992. The QED survey results further indicated that distance learning is most frequently used in secondary education and that schools are receiving programming by means of both cable and satellite (81.6 percent receive cable television and 13.8 percent have satellite dishes). The subjects most in demand are foreign languages, social studies, and mathematics.

An increasing number of elementary through secondary school educators understand that by integrating educational technologies into the teaching/learning equation, they benefit their students in another, critically important way. Distance education uses the communications technologies, the tools, of the information age. Students who are comfortable using these technologies will be better prepared to function in what Marshall McLuhan called "the Electronic Surround." These students will not be confused or intimidated by a workplace environment that includes computers, facsimile machines, audiographics, teleconferencing, and video-based training.

At the higher education level, various solutions are already being implemented: for example, fax machines are now transmitting assignments between instructors and students, while computer and phone lines are allowing "real time" interaction on student/faculty bulletin boards.

As distance educators incorporate new technology or innovative uses of current technology into their teaching, these benefits will continue to enlarge the student base for whom telecourse learning is a viable education alternative.

### *New Technological Tools*

Technological advances will overcome many perceived obstacles. Today's communications and information technology industries are re-configuring the way information moves through our society; what was impossible 5 years ago is mainstream today. These developments will affect the delivery of education in major ways still to unfold. Among these advances are:

—fiber optic delivery of 2-way audio, data and video;

—computer-based conferencing with "bulletin board" capabilities;

—interactive video capable of handling many laboratory requirements;

—compressed video, which will require less bandwidth than is currently used, facilitating greater use of video instruction;

—videotrax, a technology that allows data to be transmitted in a standard broadcast format via a video modem, enabling data to be sent before or after a telecourse cablecast; and

—high-definition television (HDTV) for use in laboratory work, allowing more precise presentation of small objects and activities to large numbers of students.

At the elementary and second levels, today's distance learning systems are, as noted in OTA's *Linking for Learning*, often "hybrids, combining several technologies, such as satellite, Instructional Television Fixed Services (ITFS), microwave, cable, fiber optic, and computer connections." Additionally, "New developments in computer, telecommunications, and video technologies continue to expand the choices, and new strides in interconnecting systems are being made regularly."

Frequently, the distance learning system involves 1-way video combined with 2-way audio, the return link usually provided by telephone. The televised image of the teacher is seen in classrooms throughout the country, but the teacher does not see the students. Communication, which is ongoing while the class is "in session," takes place by telephone. It enables students from Pensacola to Portland to benefit from each other's questions and answers, and it provides the teacher with an immediate sense of whether the instruction has been understood. The audio component may also include a "homework hotline," which students can call for help with specific subjects or questions.

Other recent advances have made 2-way graphics interactivity possible through the use of 2-way computer links. Audiographics, i.e., the use of computer-based technologies such as graphics tablets (a special digitized pad with a special pen), keypads (keyboards), scanners, printers, specially tailored fax machines, and similar types of equipment, allows even more classroom interactivity to take place, further enriching the learning experience. The computer screen in essence becomes an "electronic blackboard."

Add to these technologies the options available with video discs, optical discs, voice synthesizers, and CD-ROM, and it becomes apparent that the education environment is changing rapidly.

*New Coalitions*

Across the nation, the public is becoming increasingly aware of the need for change in America's educational system. Since *A Nation at Risk* first documented the crisis in American education in 1987, hundreds of reports have been issued, books published, and committees convened to address the declining state of American education. President George Bush, "the Education President," has called for a comprehensive, long-range plan to radically upgrade the quality of education available to all Americans, regardless of race, gender, or income. Educators, like the rest of us, understand that none of us can afford to resist technological tools that increase our professional productivity. The need for change is evident from Main Street to Wall Street, and no group is more aware of that need than our nation's educational leaders.

The drive to introduce distance learning alternatives in elementary through secondary education is spreading throughout the country. Although until recently few states had plans to explore distance education for elementary and secondary classes, today all 50 states have at least some commitment to distance education programs. The effects of this trend are wide-ranging and potentially of great benefit to both students and educators throughout the country. As noted in *Linking for Learning:*

New coalitions across state and district boundaries, new networks of educators and geographically dispersed schools receiving programming from common providers exemplify changing relationships in the education community. Educators involved in interactive instruction, computer networking, and instructional television, although developing separately, are coming together. Connections now being established across geographic, instructional, and institutional boundaries provide opportunities for collaboration and resource sharing among many groups for the coming years.

*Reconfiguring Educational Delivery*

Much of the technological infrastructure for distance learning is in place, but it needs to be connected. Much of what is probable is made possible by satellite delivery systems, cable television systems, various consumer products such as VCRs, computers and their associated software packages and modems, broadcast media, and the telephone.

What is required now in terms of the country's educational needs is cooperation. Cooperation among cable operators, satellite-delivered networks, telephone companies, broadcasters, libraries, educators, and others. To the extent possible we must all act in concert to ensure equality of access to high-quality educational opportunity in this country. Regardless of the evolving agenda of competing technologies, education must stand above these issues.

Although each of the technologies discussed above was initially relegated to a minor role in the traditional approach to teaching, teachers are now integrating them into the mainstream of the educational process. The technologies have been integrated to the greatest extent in elementary and secondary schools, where teachers have traditionally emphasized using the latest advances to improve teaching skills whenever possible. Additionally, teacher shortages at all levels from kindergarten through high school have forced certain school districts to hire technology instead of teachers. In this instance, the capabilities of educational technologies have by necessity become part of the teaching process.

Credit must be given to the far-sighted decision by such companies as Xerox, Apple, IBM, and software manufacturers to place, at little or no cost, their equipment, computers, and software in classrooms across America over the past several years. This generosity allowed both students and teachers to become familiar with the opportunities offered by computerized instruction, and to incorporate this technology into the teaching process. The cable television industry, through its Alliance for Education, is currently orchestrating the wiring of the nation's schools, thereby adding yet another tool for delivering quality education throughout the country.

### Telecourses and the Classroom of the Nineties

America cannot afford to employ teachers whose methods and skills do not keep pace with the demands and tools of today's educational environment. More and more of our country's educators are embracing this reality and are committed to using advanced educational technologies to enrich and extend the learning experience. These are the teachers who will lead our students into the 21st century.

Part of the challenge is to explore the link between effective uses of technology and effective instruction. Another part is to train teachers in the technology so they can comfortably incorporate it into their curriculum. This may include in-service training for practicing teachers, programs for new teachers, and ongoing research to document the effects of these teaching technologies. As noted by the editors of *Linking for Learning:*

If distance education is to play an even greater role in improving the quality of education, it will require expanded technology; more linkages between schools, higher education, and the private sector; and more teachers who use technology well.

A recent survey of more than 800 teachers of fifth- through eighth-graders indicated that a large majority of teachers recognize the benefits of video-based learning. The survey, carried out by Yankelovich Clancy Shulman, found that 96 percent of the teachers had access to television sets in their schools, 95 percent to VCRs, and 43 percent to cable television. Videotapes and/or television programs were considered appropriate classroom teaching aids by 94 percent of the respondents. Nearly two thirds of the teachers reported using television and VCRs, at least once a week, with 50 percent using cable as often.

In a survey commissioned by the National Education Association (NEA), the nation's largest teachers' union, responses indicated that 57.6 percent of U.S. elementary and secondary schools (approximately 2.5 million teachers) use some form of educational video programming whether from network, public broadcasting, or cable television.

America's teachers have seen the future and understand the role of televised education in it. As NEA President Keith Geiger observed, "There has been a virtual tidal wave of teachers' turning to video and television technology to help students learn." Once used strictly for entertainment, television is now being used to free educators and students from what Geiger describes as "the pedagogical prison of the 2 covers of the textbook, the 4 walls of the classroom and the 6 hours of the school day."

Technical training for educators cannot be the sole responsibility of colleges, universities and school districts. All of us are embedded in this evolution and all must contribute. Partnerships between those who develop the technology and those who use it are needed. It will require linking different technologies in a variety of ways to fit the needs of different groups of educators. The variables to consider are numerous, and the groups of people working out the concepts and details will be varied.

Americans have no choice but to undertake this task, and we must move quickly to ensure that as many people as possible have access to quality education. That education must be timely, and it must be accessible to students without undue disruption to their lives. This may require that many, many barriers come down, but so be it. The words of Richard Saul Wurman in *Information Anxiety* are stingingly true: "The issue is learning, not schools."

Since Harvard first opened its doors in 1636, there has been little change in our higher education structure, a system borrowed from our English ancestors centuries ago. We know, however, that tomorrow will not be like yesterday. The information society brings new problems, and new methods and new tools must be used to resolve them.

The electronic pipeline will be an increasingly important piece of tomorrow's educational technology. Our task is to learn not only how to use this technology, but how to use it wisely and effectively. Working together, we can use it to educate and to empower. This is the goal of Mind Extension University: The Education Network.

## Conclusion

Book shelves strain under the weight of books sounding the alarm of the information revolution and the speed at which new information is being generated. The important fact to realize, however, is that at the end of the day this information must be dealt with by an electrochemical contraption that weighs 3 pounds, more or less, takes up about half a cubic foot of space, runs on glucose at about 25 watts, processes information at the rate of approximately 100 quadrillion operations per second, looks like a big walnut, and is the world's first wet computer: the human brain. That brain is under siege. It is being bombarded from all sides by torrents of new information.

Mind Extension University is a pro-active, entrepreneurial effort to empower the individual through education, and in that manner to contribute to the conversion of information into knowledge, understanding and wisdom. It was designed as a partial solution to a growing problem: how to provide educational opportunities to the increasing number of people who want education but for a multitude of reasons are unable to attend on-campus classes. It was also designed to deliver classroom instruction from highly qualified teachers, remotely located, to classrooms in schools across America. ME/U was created as a way to deliver education to people instead of people to education.

Mind Extension University was also designed to enlighten through education any viewer, registered student or not, who has an interest in learning. To create, on cable television, an educational community. It is intended to create interest and excitement about education generally and to encourage lifelong learning.

Mind Extension University is part of the entrepreneurial evolution of cable television. It focuses not on what cable was or is but rather on what it can become. It is based on the concept of actively engaging the minds of its viewers in a positive way. Technological advances have created a communications environment where vast amount of information can be delivered inexpensively. An environment where time and distance are erased. Both individuals and committees, in great numbers, have defined many of our educational problems. Continuing study and dialogue may be necessary, but it is clearly time for those who can act to act. To act boldly, now.

If there are 50 students in an average classroom, then cable television's 55 million subscribers, multiplied by 2.5 people per home, represent a potential school with 2,750,000 classrooms. Cable television can be of enormous help in today's environment. It is simply a matter of acting.

The television industry must respond to the country's needs. We must commit. Although cable television is improving the situation, we as a nation cannot afford the television environment described recently by media critic Duane Elgin:

Less than 5 percent of prime-time TV is typically devoted to informational programming. We are entertainment rich and knowledge poor: at the very time our democracies face problems of marathon proportions, we're preparing for that marathon with a diet of junk food.

Problems strain for resolution, and the means for resolution are now available to us. There is a strong sense of need in the air, and the environment is ripe for change. Many educators are eager to use the electronic tools of the information age, and their numbers expand daily. We must work together. There is a place for everyone in this undertaking.

Imagine the vibrant energy and intellect of Athens during the time of Socrates and Plato. The ghost of Athens is visible today.

It has been said that Plato, in all his strivings to imagine an ideal training school, failed to notice that Athens itself was a greater school than even he could dream of.

Let us notice *our* environment. It is time now to fuse our electronic tools of the information age with our great teaching institutions and repositories of information. It is time to create a nation that is, like Athens was, a great school. A place vibrant with interest and excitement about education. A place where educational opportuni-

ty is visible to all and hope is alive. A place that sees the wilderness of information as our new frontier.

The CHAIRMAN. Mr. Werwaiss.

Mr. WERWAISS. Good morning, Senators.

Thank you very much for inviting us here. I am William Werwaiss, and with me is Kathy Buccy. We are both with Southern New England Telephone. Southern New England Telephone is the local telephone company that serves most of Connecticut, and we only operate within Connecticut.

It gives me great pleasure to come down here this morning and describe our experiences with distance learning, the successes that we have already experienced and the potential that we know is there as you consider reauthorizing the Star Schools program.

My written testimony will describe our experience in some detail, and in the interest of time I will cover the key points briefly.

After a long history, certainly as long as I have been in the business, of working closely with education and with children, our company in 1988 formed a formal partnership with our State department of education and a group of local schools to provide distance learning. We called our program Links to Learning.

As part of that program, we deployed 3 different telecommunications technologies—data access, voice mail, and 2-way interactive video—and put them to work in 34 schools in 26 communities around Connecticut—urban, suburban and rural, rich and poor communities as well.

We have invested considerable time and money in Links to Learning as a corporation. We have brought in modern fiberoptic technology. We have underwritten statewide grants and made numerous in-kind contributions of staff time to this program.

The State department of education and the local boards were really absolutely critical partners in this. I think the only thing that really makes this go is that sort of a partnership between industry and the people who know the technology and provide it and the people who know education and who do it.

Why in the world would a company like ours do that? I think we do it really out of some sense of self-interest. We believe that a quality education system is essential to the maintenance and development of the Connecticut economy. Being a Connecticut company, our economic health is tied to the economic health of Connecticut. So we saw this as a program which had benefits not only to the people that we were helping, but benefits to our company as well.

We have an important asset, the existing telecommunications infrastructure in Connecticut and the infrastructure that we are building. We believe that it should get the greatest possible use, and what better use than improving children's education.

Distance learning technology is a tool that can help get information into the classroom more quickly and efficiently, and because it is up-to-date, as has been described many times earlier today, more accurately.

And certainly in Connecticut, where we have to turn now more and more to the international economy, it is very, very important for us to be able to compete in the global marketplace.

The reaction of the people who have participated in the program has been overwhelmingly favorable. Teachers, students and parents have all responded very favorably to the program and created new uses for the technology beyond anything we ever imagined that they would do with it.

In 1989, the second year of our Links to Learning program, the newspapers and TV were full of the story of the Berlin Wall coming down. Students at Crista Hary's German class in Norwalk High School had their own source for news, in its own way a better source than CNN or Tom Brokaw or the *Times* or the *Post*, because they were communicating directly by electronic mail with their computers with students in Germany; they were able to ask these students in Germany questions and get their answers back on their electronic mailbox—a very, very exciting thing for them and I imagine for the students in Germany as well.

In Madison, CT, we also used data technology to allow students to write and receive electronic letters to senior citizens in a nearby center. They were studying the Depression and World War II, and they were able to communicate with the seniors who lived through these events and get a first-hand description and real better feel than a dry textbook could ever get them. And the seniors loved it, too; they loved learning and using the technology themselves.

Most of the focus has been on video, and we in Connecticut have not lacked that, either. Our video is somewhat different. It is not studio-based; it is classroom-based, and we have 2 video operations that are going on in Connecticut today—one involving fiberoptics in the Greater New Haven area, linking 5 schools there, where it is 2-way switched video using fiberoptics. The other links 2 schools in the Hartford area, one in downtown Hartford, which is unfortunately one of the 10 poorest cities in our country, and the other from a rather affluent suburb of West Hartford. That is using video compression over the same sort of T-1 copper lines that are available pretty ubiquitously around the country.

So we have one that we can do now with the technology that is just starting and which we expect to spread, but there is also a way of doing this, using the technology that is virtually ubiquitous around the country.

The examples go on and on. I think what is important, though—and we did this for a 2-year period and provided the money from the corporation—is that we can make the ideas of educators and students come true using our technology. We didn't feed them the ideas, we didn't feed them the curricula—we enabled them to do the things that they do best so that the curriculum control stayed in the classroom. As the lady from Massachusetts said, certainly in Connecticut and in New England, we have an enormous tradition of local control, and sometimes that is good and sometimes it is a barrier, but in any event it is a fact out there. So keeping this control within the classroom was very important.

Despite its name, distance learning has really brought teachers and students and parents closer together. In one application that I'm certainly glad wasn't there when I was in school, we used the voice mail application. Teachers could tell parents whether or not there were homework assignments. So my ploy of assuring my parents that there wasn't any homework tonight certainly would not

have worked under those circumstances; fortunately, that wasn't available when I was growing up.

Even with the success of Links to Learning, we know that more students ought to have access to distance learning. After 3 years of involvement, taking us into only a few of the several hundred public schools in Connecticut, a major of the students still have not experienced how distance learning works. Teachers may well not appreciate its potential. There are still haves and have-nots.

I will digress a minute and say that even though unfortunately we were not a recipient of a Star Schools grant in Connecticut or that our company was involved in, the OTA people have been very, very helpful, and the information that they have put out both in video and in written form has been extremely useful and helpful to us in explaining to people and making a rather conceptual idea come alive.

We at SNET really do believe that the Senate Labor Committee, through the reauthorization of the Star Schools program, can make a significant impact. You can send the message that the Federal Government really does believe that the time for distance learning has come. We believe it, and we certainly hope that you will reauthorize the program.

[The prepared statement of Mr. Werwaiss follows:]

PREPARED STATEMENT OF WILLIAM F. WERWAISS

Good morning. Thank you for inviting me here on behalf of SNET—Southern New England Telecommunications—to testify on the Star Schools program—and our experience as we have begun to deploy advanced technology to the education of our children.

My purpose today is to talk about the technology we at SNET have deployed, what that technology has done to enhance education in Connecticut—and what we see as the future of that technology. As a one-state, virtually-whole state, provider of telecommunications services in Connecticut, SNET is an important part of Connecticut's infrastructure. Over the past 113 years, SNET has forged a strong social and economic bond with our state and its people.

In September of 1988, SNET, in partnership with the Connecticut State Department of Education and local school districts throughout the state, initiated a program called SNET Links to Learning. In it, we deployed 3 different kinds of telecommunications technology—data access, voice mail and 2-way interactive video—and put these information age tools into 34 schools in 26 different communities, all the way from small, isolated rural towns to inner cities and suburbs.

Doing this was not a small project. SNET committed extensive resources—money, staff time and expertise—to this program.

We did it for a number of reasons. We believe that a quality educational system is essential to the growth, development and general financial health of Connecticut. We are committed to using our resources to support the state's schools and programs on a variety of education levels, and this was not technology for the sake of technology. We believed that these telecommunications technologies could enhance the education of our children.

Just as important is that we do it. The SNET public switched network is already in place and reaches into every corner of the state, so that we could touch any and every community in Connecticut. This alone places Connecticut in an excellent position to lead the country in the use of this educational technology—and to do it statewide.

Most important we believed that telecommunications technology can be a tool that people—men, women and, most especially, children—can use to help themselves learn more quickly, more efficiently—and more thoroughly. We believed it could help them find information they couldn't find any other way. Reach ideas and concepts that had been unreachable. Learn more about their world.

We didn't know exactly what teachers would do with this technology. That, too, was important. Part of our partnership was to do what we did best—deploy the technology—and let the educators do what they did best—develop programs and

teach. We did not want to dictate programs or policies to school systems—did not want to force feed information. Instead we wanted administrators, teachers and students to have full access to a wide range of information—so that they could develop the programs and projects they felt served their local needs. Teachers and students both impressed us with their creativity, adaptability and originality.

SNET professionals worked closely with local schools to demonstrate telecommunications, provide technical assistance, act as consultants and facilitators. At trial's end, a 2-year evaluation of SNET Links to Learning concluded that each of the 3 trials successfully met the objectives and expectations; and trial participants wanted their schools to continue using telecommunications technology and recommended that other schools adopt the technology.

"Not sure how we lived without it before this," one teacher wrote of voice mail, which allowed teachers to send phone messages to individual parents and let parents respond on their own time. "I never had better communication with parents," another said. Other teachers reported that students who used the data technology were more enthusiastic about school, more enthusiastic about doing research and got more from the work they did.

That's key, ladies and gentlemen. The strongest proponents of this technology are the students themselves. To those of us on the dark side of 40, this new technology may be arcane and mysterious—and when we want our VCR programmed, we ask a sixth-grader to do it for us; when the office copier goes down, we expect a 19-year-old secretary to work some magic. Today's students have grown up with "Sesame Street," MTV, VCRs and Nintendo—and they take to the new classroom technology as though it were a new game or new toy.

And they make the technology work in ways we couldn't have imagined. During autumn of 1989, in the second year of SNET Links to Learning, when newspapers and TV news shows were full of the Berlin Wall, some of the most up-to-date people in Connecticut were students in Crista Hary's German class at Norwalk High School. While you and I were watching CNN, Tom Brokaw or reading The Post or The Times, these students were communicating with their electronic pen pals in West Germany—and getting daily, on-the-spot reports and reactions from them over the computer, through the data access technology of SNET Links to Learning. Technology not only gave them a different picture, but an up-to-date one in a situation where every day brought a new revelation.

The SNET Video Link trial using full-motion fiber optic technology confirmed that distance learning is a solid option for education in the 5 trial schools. We also linked Hall High School in very affluent West Hartford with Bulkeley High School in Hartford, an inner city school in one of the nation's poorest cities—and kids from the 2 communities took Spanish classes together. Students could see one another, talk to one another and, while they learned Spanish—also learned from and about one another. This interactive video trial used compressed video over existing T1 copper facilities, providing another transmission option which, in many cases, already exists as part of the network available to schools.

We found that telecommunications technology can improve educational offerings and make them broader. We had 5 high schools—North Haven, Cheshire, Hamden, Amity in Woodbridge and Wilbur Cross in New Haven—linked by 2-way interactive video—and the fiber optic lines were busy all day.

In the first period, Italian I is taught from New Haven and received in Amity and Cheshire. Second period, it's Russian, taught from Amity, sent to Cheshire. Third period is etymology, taught in North Haven, received in Hamden. Second year Russian goes from Amity to Cheshire in the fourth period. In fifth period, it's second year Italian, North Haven to Cheshire and Amity. Astronomy is sixth period—Cheshire is the sender with Amity, New Haven and Hamden on the receiving end. Hamden hosts the last class of the day—philosophy—and it is sent to Cheshire and New Haven. At one time these schools could not offer these courses. With technology, they all can.

Our experience with distance learning at the local level has demonstrated that teachers are key to making distance learning work and are the best programmers you could find. As they collaborate with other educators on the system, they share more and become better teachers. We've found that maintaining normal class size enabled teachers to keep personal contact with students, and allowed students to socialize with students from other towns—an important cultural advantage. Students can be taught by top teachers from within the participating towns—an advantage enthusiastically cited by administrators.

Because we can do local programming, our network has been used for professional development, adult education in the evenings, including a citizenship class which

paired our newest citizens to be with our newest delivery medium, and has allowed us to provide special events beyond the original audience.

If the technology can expand curriculum—especially in a time of tightened budgets—it can also reach students who are otherwise almost unreachable. At at East-Conn, one of Connecticut's 6 educational districts, students in the alternative high school—kids many high schools would almost give up on—use this technology to play a stock market game. They use the computer to access Dow Jones News service and other data bases to research publicly-held companies. Once a week they interact over the same computer link with other students, buying and selling stock. At the end of their first 10-week game, these kids—some learning disabled, none of whom had ever had much luck in a regular class room—placed 16th in a competition of 160 teams that included students from some of the most affluent suburban high schools in the state.

But it's *not* only young people who take to the technology. At Academy Elementary School in Madison, fifth graders are learning history by writing letters electronically to men and women at "The Depot," a senior citizens' center, who read the children's letters and respond electronically themselves, telling stories of the Depression and World War II, very proud of themselves for learning to use the computer. I said earlier that children are especially keen on the technology, but this experiment shows that adults as well can learn it, learn to like it—and can use it to reach out.

In Connecticut we have shown that the technology can enhance education by broadening horizons and broadening the curriculum. In a time of rising book and magazine prices, it can bring new and up-to-date information into schools. It can reach the hard-to-reach. It can enhance learning for any age group—kindergarten to post-retirement.

What barriers do we see to increased use of this kind of technology? One is simply cost—some of this technology is expensive. SNET was glad to sponsor the first 2 years of SNET Links to Learning—and, once schools had learned how valuable the technology was, most systems have found room for it within their very tight budgets.

We've been able to help 13 other schools in 1990 through the first through SNET Telecommunications Incentive Grants that enabled them to get the technology for their own use. We intend to continue the grants. We committed $50,000 last year, and another $50,000 this year.

We would hope that other businesses might follow this lead. The authors of this bill have already spoken of the need to find ways to deploy this technology more quickly and more fairly—we could not agree more.

Years ago, the telephone system grew and spread because of a philosophy of universal service akin to the American idea that every child had a right to a free public education. And when the most rural of school systems sent a school bus down the most thinly settled road to get one child from one isolated farmhouse, the telephone company sent a line crew down the same road to install poles to run a telephone wire to that same farmhouse. No one from the board of education told the farmer, "You have to have the road paved" and no one from the phone company said, "We'll give you a phone if you pay us for the poles and 2 miles of wire." Wiser, more compassionate heads said that the long-range benefits of educating every child and getting a phone to every house were more important than making sure everything was paid for up front.

We still feel that way about this technology and its impact on education. We are continuing to build the telecommunications infrastructure that makes it possible to deploy these technologies—and other technologies our nation will need in the 21st Century.

But the benefits of this technology are too important not to be deployed as quickly and as thoroughly as possible—its potential to provide teacher training, to provide early childhood education, language training, to build understanding, to link networks around issues of national importance, to link libraries and data bases and news services is well-known to all of you. But this deployment can't all be done privately. Above all, it can't be administered and decided on privately. Even with the best of intentions, and the most charitable of donors, that will leave us, I'm afraid, with educational haves and have-nots. And none of us wants that.

I've told you what we have done with the technology and what it can do. The technology will continue to be deployed—we'll do some ourselves. You have already, through the authorship of this bill, articulated a philosophy and a direction akin to our own—and we are pleased to offer our support and advice to you as you seek to further refine and expand what this technology can do. And must do.

But technology—and the ability to deploy it—is not enough. The vision of what it can do for all the people of this nation—and, especially, for the children—must

come from men and women like yourselves, who have been entrusted with the welfare of those children and whose sworn allegiance is to all the people. Thank you.

The CHAIRMAN. Thank you very much. Those were enormously constructive comments from both of you.

Let me ask have you had a chance—or will you; you haven't had a chance because we introduced it yesterday—to review the legislation, and I'm going to ask the same of the previous panel, to take a look through the legislation and give us your comments. That would be enormously valuable, I think, and if you have some suggestions about who else to send it to for their ideas, we'd welcome that.

I think one of the things we'd like to know is are there sufficient incentives to get the private sector more involved in the program. There hasn't been as much focus on that in the past, but it is certainly something we obviously want to have included. So perhaps you can look through the legislation and give us some reaction to that.

Do either of your companies donate in-kind services, like open channels for educational use?

Mr. WERWAISS. In the case of the programs I described, Senator, they were all donated, and in fact in addition to the out-of-pocket funding for this and purchasing the technology, we had 3 full-time employees dedicated for a period of over 2 years, involved in this program.

The CHAIRMAN. Do school districts pay for the channels, or how does it work?

Mr. WERWAISS. At the moment we're paying for them, and as everybody knows and I don't want to dwell on it, there is huge pressure on local budgets and on the State budget. We are not in a position to continue even the level of funding that we have on an indefinite basis. Our hope was that we would do a demonstration project, and people would pick up and run with it. Unfortunately, we were on the wrong end of the economic curve, and we are very, very much afraid that the programs that we have put in are at risk.

So as I view it at the moment, anyway, funding is the principal barrier that we are dealing with.

The CHAIRMAN. Mr. Liptak.

Mr. LIPTAK. Senator, in our case, our cable television network is a basic cable service, so if you are a cable subscriber across America, you receive it on the dial just like CNN or ESPN, et cetera.

The people who participate in the network, if they are enrolled in a university program, we act if you will as the electronic pipeline for that university. We collect the tuition and remit the tuition to the university.

In the case of our secondary school material through the TI-IN network, they have a pricing mechanism that deals directly with individual schools or school districts. So we have a variety of ways of attempting to finance the network.

The CHAIRMAN. Is there such a thing as an educational rate, like we have commercial and residential rates for phone service?

Mr. WERWAISS. Senator, there currently is not in Connecticut; that is pretty much a State-by-State decision. It is a question of how do you want to fund this. A number of years ago, there was a

government rate that was actually applied more broadly than education to all forms of government; that has been done away with. It could be brought back. There is no reason for it not to be brought back.

The CHAIRMAN. Do I conclude, then, that the principal barriers that you see to increased use of telecommunications by the schools is financial?

Mr. WERWAISS. I certainly would say so. I think the technology is there, and it will get better, but we have an in-place, in-being technology that we are using. The teachers and the State department of education are very enthusiastic when the technology is made available to them. The kids like it. It works. It is just a question of affording it.

Mr. LIPTAK. Senator, as we travel around the country and deal with many States and literally hundreds of communities, the pattern is exactly the same. The cost pressures on the schools are immense. I would suggest that perhaps one small part of the solution to the Nation's problem with the schools is to employ distance learning. I think we see school districts looking at distance learning as a potential way not only to enhance the program, but to avoid costs.

The CHAIRMAN. Finally, what kinds of programs work well in your experience, and what needs improvement?

Mr. WERWAISS. Well, in our case we're talking about—as I said, it's not a studio-based program. There really are 2 classrooms, with monitors in both classrooms, and everybody can see each other, and everybody can talk. We have seen it work very well with language. We have seen it work every well with social studies, and we have seen it as well work with science and other things like that. It pretty much replicates—at least in the fashion that we're doing it, which is different from some of the programs you have seen done today.

The teachers have told us that they have got to work a lot harder at preparing—there is something about that camera being on and so forth that means that they really do need some support and some help in order to make maximum use of this. But it seems to work with everything we have tried it with so far. We have not had what I would call a failure.

The CHAIRMAN. OK. Those are very helpful comments.

Senator Cochran.

Senator COCHRAN. Mr. Chairman, I just wanted to thank the panel. We appreciate your being here and helping us understand how some of these new technologies are being used and can be used even more in the future to enhance learning experiences for our students around the country.

I might just add that in Connecticut you described what you are doing there, linking up school districts with fiberoptics, as I understand it——

Mr. WERWAISS. We're doing both the fiberoptic and the traditional technology.

Senator COCHRAN. —and the cable ground system.

Mr. WERWAISS. That's correct.

Senator COCHRAN. So this does not involve satellite technology as such, as I understand it.

I think that's what we're doing in Mississippi. There is something called Mississippi 2000 that involves the educational television authority in our State, which has statewide television transmitters so that we have total coverage. I think we were the first State in the Union that did that, as a matter of fact—one of our firsts—we get credit for a lot of lasts, but we've got a lot of firsts, too, that are overlooked, and that is one of them, a statewide television hookup.

We are also seeing Bell South involved in that; they are linking school districts so that they have 2-way interactive television capacity. We had the sound this morning in some of these schools, but as I understand it with this technology you are able to actually see the student, the student can see the teacher, and it is a much more realistic kind of experience.

Is that what you were telling us about?

Mr. WERWAISS. That is correct. There are several monitors in each classroom so that the students can see the teacher and the other students, and the teacher can see the students and so forth. So it is a different proposition than what was seen here.

I would observe that I do think there is a place for both. It is certainly not possible to visualize in the near future some of the broad-scale, multi-State applications that are university-based being 2-way interactive, and that is certainly a worthwhile thing. But the experience that we have had is that the 2-way interactive, although it seems to be somewhat more geographically bounded, definitely works; people like it; people are educated by it, and I think within reason it is affordable.

Senator COCHRAN. Well, we appreciate getting that perspective, and your contribution to the hearing has been very helpful.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator.

I had just one final question, and that is whether your technology lends itself to any kind of individualized service delivery. For example, could a particular child who was homebound for a period of time receive a signal from his or her classroom?

Mr. WERWAISS. Well, of course, we've done audio homebound for a number of years. It certainly is well possible using the bandwidth compression and the copper technology today to do that. It would be a question of cost, but certainly the technology is there to be able to do that; we have seen it done in alternative schools.

The CHAIRMAN. Senator Dodd.

Senator DODD. Mr. Chairman, we have just had 2 hours of hearings on municipal financing on Bridgeport, Hartford and New Haven, so I apologize, but our witnesses certainly appreciate that that is no small issue to us in the State.

What you've just heard, Mr. Chairman and Senator Cochran, is a tremendous example of something that has been working tremendously well now for a number of years in Connecticut, and SNET really deserves a great deal of credit for what they have done in proving that those public-private partnerships really can work and make a difference in education. It has been tremendously effective.

I should tell you as well, Mr. Chairman, that it is not terribly surprising that SNET would have done this. They have a history over the years of being on the cutting edge of moving in these

areas that go beyond any immediate financial concerns to the business interest. We have seen in a number of important social policy questions and issues that this company and its employees have really been in the forefront.

So it is a pleasure to have you down here, and appropriate that you should be here because of your experience.

Mr. WERWAISS. Thank you very much, Senator.

The CHAIRMAN. Well-said, and we thank both of you very much. I think what Senator Dodd said certainly applies to Mr. Liptak as well, and your recommendations and suggestions on this legislation will be given very special consideration.

Again, we thank all of those who participated, and we look forward to your comments on the legislation.

[Additional statements and material submitted for the record follows:]

PREPARED STATEMENT OF SENATOR BROCK ADAMS

Today's hearing on Star Schools brings attention to this small but critically important and successful program. The Star School Program improves student's access to teachers and educational resources that they otherwise wouldn't have. This federal program is a valuable effort to improve our nation's educational system.

We need to improve the quality of education and the opportunities our students have in the public school system. Students across the country lack a full range of resources, not because the resources don't exist, but because they don't have access to them. In Washington State, for example, a small community such as Oroville has a limited educational offering due to their small population and remote location. Many schools in Washington and around the country also operate with outdated materials and a limited number of educators.

The Star Schools Program Assistance Act of 1987 effectively uses today's technology to connect students and classrooms to educational opportunities that otherwise might not be available to them. Students are exposed to a wide range of subjects available through satellite hook-ups with quality teachers around the country. Technology is helping to meet the needs of small schools with limited budgets. This program also benefits teachers in the form of increased training, resources, and interaction with other professionals in their field. Through Star Schools, students like those in Oroville now have the opportunity to study a variety of subjects not previously available.

The future is bright for Star Schools. This program could serve many other citizens in addition to the thousands of students and teachers. For example, we could teach reading and writing to the millions of illiterate Americans. Immigrants could learn to speak English without having to travel far from their home community. Star Schools effectively combine an old-fashioned education with modern technology. This federal program certainly deserves our full support.

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KAYCEE PUBLIC SCHOOLS,
KAYCEE, WY 82639,
*April 24, 1991.*

HON. EDWARD KENNEDY,
*Chairman, Committee on Labor and Human Relations,*
*U.S. Senate,*
*Washington, DC 20510.*

DEAR SENATOR KENNEDY: As a teaching partner involved in the AP American Government class from Oklahoma State University and involved in the session on Wednesday, April 24th, I would like to address the following questions and concerns:

1. Is the use of technology beneficial to students?
2. Why are these classes of use beyond the traditional classroom? What do they provide?

Kaycee High School finds that the satellite classes assist us in the following ways.

1. The distance learning programs provide assistance to areas which are geographically isolated. Our students and staff do not have ready access to materials or upper educational opportunities. We have the only 4 year university in the state, 250 miles from here.
2. The satellite programs provide enrichment to existing curriculum and expansion of programs. Teachers have a minimum of 6 different classroom preparations a day and as high as 9.
3. The technology allows gifted students and those with unique interests and needs to pursue classes we cannot offer within our curriculum due to staffing and financial constraints.
4. The teleconferencing system allows students to learn something about students in other areas of our country. It aids students in evaluating themselves, others and their views.
5. It assists students in becoming more independent learners which is a key in post secondary success and life long learning.

Our professional staff is dedicated to and determined that the small size and remoteness of our school will not hinder our students as they prepare for college, life and the 21st century. The distance learning is one way we can help our students.

Thank you for your time and consideration.

Respectfully submitted,

JEANNE M. TINNIN,
*Principal.*

---

OKLAHOMA STATE UNIVERSITY,
STILLWATER, OK 74078,
*April 22, 1991.*

AMANDA BROUN,
*Chief, Education Counsel,*
*U.S. Senate Committee on Labor and Human Resources,*
*SD-428, Dirksen Building,*
*Washington, DC 20510-6300.*

DEAR MS. BROUN: As the Senate Committee on Labor and Human Resources considers funding and grant guidelines for Star Schools distance learning grants, I would like to provide you with input from the Arts and Sciences Teleconferencing Service (ASTS) at Oklahoma State University, the leading program provider of the Midlands Consortium.

The Department of Education has asked that distance learning be used for at-risk students. *Basic English and Reading By Satellite,* developed under our Star Schools grant, is a prime example of using the medium for this purpose. We are exploring new programs for at-risk students and inmates and would appreciate the opportunity to apply for future Star Schools funding to support these efforts.

While most schools used their Star Schools grant money and satellite downlink equipment very efficiently and responsibly, there were some exceptions. I would like to recommend that school districts be required to develop a 5 year plan for the implementation of distance learning (including need, scholastic preparation of students for courses, and training for the classroom teacher who will work with the students to make the instruction effective) and make a financial commitment to the program. Oklahoma schools will continue to use their equipment and students will benefit immensely because we required school administrators and board members to make a long-term commitment to satellite-delivered programming. We have shared our model with the current Star Schools grant recipients and will continue to work with future grantees.

It is extremely important that Star Schools grants encourage entrepreneurship and a competitive marketplace. Only in this way will schools be able to select the best programming for their students. As you are planning for the next round of Star Schools funding, please contact me if I can be of any assistance.

Sincerely,

DR. SMITH L. HOLT,
*Dean.*

OKLAHOMA STATE UNIVERSITY,
STILLWATER, OK 74078,
*April 16, 1990.*

AMANDA BROUN,
*Chief, Education Counsel,*
*U.S. Senate Committee on Labor and Human Resources,*
*SD-428, Dirksen Building,*
*Washington, DC 20510-6300.*

DEAR MS. BROUN: As we have discussed by phone, Oklahoma State University is pleased to have the opportunity to provide input to the Senate Committee's deliberations pertaining to the Star Schools legislation. The producer of the *Advanced Placement American Government* course, the OSU Arts and Sciences Teleconferencing Service (ASTS), served as the flagship producer of student distance education programming within the Midlands Consortium Star Schools Project. ASTS, along with the College of Education and Educational Television Services at OSU, continues to develop and produce distance education programming, cooperate with other Star Schools grantees, and promote the objectives of the Star Schools legislation. We believe that this legislation has provided critically important learning opportunities for students and teachers, especially those in rural and disadvantaged areas, which they would not otherwise have had.

Dr. Robert Spurrier, the professor for *AP American Government,* has been exceptionally cooperative in making modifications to both the format and content of his class to accommodate the unique requirements of the Senate Committee hearing. He will have a class of 9 students from the Perry, Oklahoma High School with him in the studio and is also prepared to ensure that several schools are online during the committee hearing. Dr. Spurrier's topic for April 24 will be "Constitutional Powers in Balance: Congress, the President, and the Courts".

When your planning is complete, please provide me with the following information:

1. The time period during which the committee members will be online and when they may interact with Dr. Spurrier, the students in the studio, or with students at the designated sites where the school will be online; and
2. The list of schools which you specifically want to be online. As requested, I have enclosed a list of participating schools from which you can select. Dr. Spurrier has indicated that the following schools would be good ones to have online for the interactive portion of the class:

a. Houston High School—Houston, Mississippi
b. Enosburg Falls High School—Enosburg Falls, Vermont
c. Spoon River Valley High School—London Mills, Illinois
d. Fredericktown High School—Fredericktown, Ohio

I have spoken with Torgun Eckrod of the Senate video production studio to discuss the relevant technical details and have also asked the director of *AP American Government,* Ms. Lisa Allen, to finalize the technical aspects with Torgun. For your reference, you may wish to have the following names and numbers for further discussion pertaining to AP American Government or the programs and services of ASTS.

Dr. Robert Spurrier, Professor, AP American Government, (405)744-5092.
Ms. Leigh Beaulieu, Manager, Arts and Sciences Teleconference Service, (405) 744-7895.

Again, I have appreciated the opportunity to work with you to ensure that the committee is able to participate in one of our distance education programs. I am confident that the Senators will be impressed by the ability of our telecommunication system to provide educational experiences to America's schools.

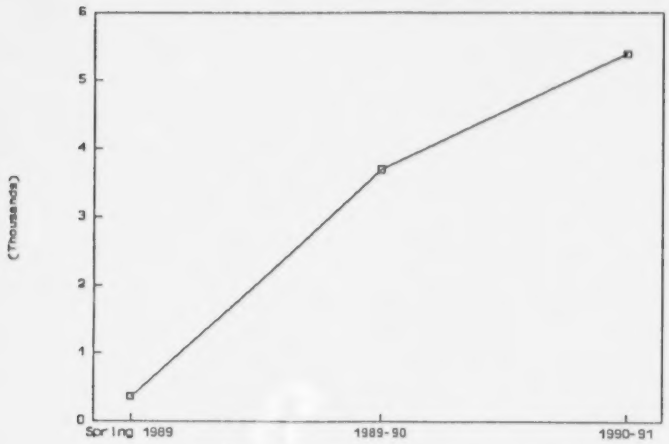
Sincerely,

MALCOLM V. PHELPS, ED.D.
*Director.*

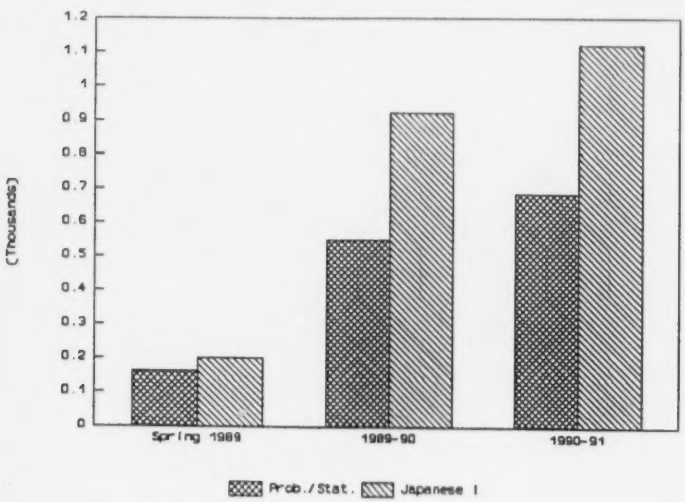
cc: Dr Robert Spurrier, Professor, AP American Government
Ms. Leigh Beaulieu, Manager, OSU ASTS
enclosures: Roster of Participating Schools—AP American Government
Guidebook for AP American Government
Teaching AP American Government (Congressional Quarterly)

3

SERC STUDENT GROWTH




ENROLLMENT GROWTH OF ORIGINAL SERC COURSES



Teaching AP American Government

March 1991

Congressional Quarterly Inc. 1414 22nd Street N.W., Washington, D.C.

# Oklahoma Educators Take to the Airwaves in New AP American Government Program

## *Congressional Quarterly* Weekly Report *to be Key Resource for Students and Teaching Partners*

AP courses offer students excellent educational opportunities: a head start on college credit ... a way to see what a college course is like before leaving high school ... the tools for good citizenship. But sadly, some might never get the chance to participate in an AP American Government course.

Many small schools across the country simply can't absorb the costs of a full-scale AP American Government program, particularly if only one or two students want to enroll.

That's where Oklahoma State University's Dr. Robert Spurrier, Natalie Gentry and the Congressional Quarterly *Weekly Report* come into the picture. Literally.

Three days a week, 450 students in 47 school districts and 15 states tune in to televisions in their classrooms for Spurrier's AP American Government by Satellite.

### A satellite learning experience

Designed for high school seniors and outstanding juniors who are mature, highly motivated and who demonstrate a record of solid academic achievement, AP American Government by Satellite helps high schools offer students the challenge of a college-level AP course without the high administrative cost of an on-site program.

The course is team-taught by Dr. Spurrier (professor of political science and director of the Arts & Sciences Honors Program) and Natalie Gentry (satellite instruction specialist) from the OSU campus in Stillwater, Oklahoma.

Spurrier

Gentry

Spurrier earned a Ph.D. in political science at the University of California — Santa Barbara and has taught at OSU since 1972. Gentry is an honors graduate of Oklahoma State University with a double major in political science and foreign languages and professional experience in the public and private sector.

Both have worked together on several other national teleconferences. Their course is offered through the Arts & Sciences Teleconferencing Service (ASTS) at OSU, and their producer/director is Lisa Allen of OSU's Educational Television Services.

### A college-level course

Because many of the participating students will take the AP American Government exam, the course incorporates detailed coverage of constitutional underpinnings of U.S. government, political beliefs and behaviors, political parties and interest groups, institutions and policy processes of national government, and civil rights and liberties.

Spurrier and Gentry prepare and present the material for each broadcast, and "Teaching Partners," as Spurrier calls classroom teachers, play an integral role in coordinating student learning. Students can interact with Spurrier and Gentry via a toll-free number during the broadcast and throughout the week as well.

Two days a week, a "Viewpoint" segment gives students the opportunity to call and talk about the material. Recent sessions have averaged five calls in 45 minutes, and calls come from all over — Alabama, West Virginia, Maine and Arkansas, for example.

### The Congressional Quarterly *Weekly Report*: A Key Resource

A critical resource for this innovative program is the *Weekly Report*, a nonpartisan journal on Congress, legislation and politics. It, along with the primary American Government textbook, is required reading.

**Congressional Quarterly *Weekly Report***

In his course handbook, Spurrier explains, "Students will be expected to keep current with developments on the national political scene and relate these developments to materials in their texts and the televised lectures. The *Weekly Report* is required for this purpose, and we recommend that it become a permanent addition to your school's library following the completion of the course this semester."

According to Spurrier, AP American Government students need the *Weekly Report* because, "It's the only way to hope to keep the library resources of small schools current on national political affairs."

"It's the best tool for keeping everyone up-to-date on current events in Congress," Gentry agrees. "When you give students something to relate the concepts to, the ideas 'stick' better.

"We pull material from the *Weekly Report* for our presentations and want the students to become familiar with it, too," Gentry says.

The magazine kindles student ideas and questions in the course and can be used throughout students' academic careers, too. If the *Weekly Report* is in the library.

### New AP Program

*(continued on page 2)*

Gentry continues, all students, not just AP participants, can take advantage of it to learn more about Congress.

### What is the *Weekly Report*?

The *Weekly Report* is published by Congressional Quarterly Inc., a Washington, D.C. publishing and information services company owned by the *St. Petersburg* (Fla.) *Times*.

Introduced in 1945 as a quarterly congressional news service for newspaper editors, reader demand soon turned CQ into a weekly publication.

For more than 10,000 professionals in a variety of disciplines who follow Congress, the *Weekly Report* has become an essential resource. In addition to major print and broadcast media organizations (such as *The Washington Post*, *The New York Times*, *The Wall Street Journal*, and the NBC, ABC and CBS television networks), *Weekly Report* readers can be found in corporate government affairs offices, law firms, think tanks, federal agencies and departments, embassies, colleges and high schools, and even Congress itself. Virtually every congressional office subscribes to the *Weekly Report* and many other CQ publications as well.

The *Weekly Report* is ideal for an AP American Government course because it helps students trace the legislative life of issues currently debated on Capitol Hill — from agriculture and the budget to defense, economic and foreign affairs, social issues and trade. The magazine charts issues through the legislative process, from introduction to committee, to the floor and the president, in clear descriptions and trenchant analyses of the people and politics involved -- with the highest commitment to accuracy, objectivity and comprehensiveness.

Spurrier and Gentry target certain parts of the *Weekly Report* for class discussion, and the magazine serves as an ongoing resource for papers and reports. "It's great for any research students want to do on the three branches of government, elections and votes," Gentry says.

Weekly trivia questions posed by Spurrier and Gentry come from the pages of the *Weekly Report*, as does essential information on committee leadership, members of the 102nd Congress, votes and more. Gentry also has relied on CQ coverage to teach about issues surrounding President Bush's veto of the civil rights bill, the "Keating Five" ethics investigation and events in the Persian Gulf.

### The politics of war

War in the Persian Gulf has driven Spurrier to step up his use of the *Weekly Report* and "special report" editions of the magazine. "Deciding on War," a January 5 special report from CQ, covers issues such as civilian control of the military, the constitutional role of Congress in wartime, the president as commander in chief and chief diplomat in up-to-the-minute, real-life detail.

The January 18 OSU telecast, which was scheduled to cover federalism, instead was titled "The United States Goes to War." During the show, Gentry assigned students 19 pages of reading in "Deciding on War."

Included in the pages assigned was a four-page chart called "Key Dates in the Gulf Crisis," a virtual day-by-day chronology of gulf and related events from August to January.

"The *Weekly Report* is nationally known by political scientists for its timely, excellent material, its authoritativeness, accuracy and neutrality — it has no axe to grind," he says.

And, Spurrier asserts, most high schools wouldn't have access to solid congressional information without the *Weekly Report*. American government textbooks or an encyclopedia try to fill the void, but Spurrier feels, "There is nothing nearly as sufficient in depth and detail [as the *Weekly Report*]."

### Technology as a teaching tool

OSU Educational Television Services maintains commercial-level technical quality in facilities that rival most urban

**New AP Program**
*(continued on page 4)*

# The Congressional Quarterly *Weekly Report:* At Home in the Classroom

**By Mary Jo Detweiler**
*Education & Library Services Manager*
*Congressional Quarterly Inc.*

As a former librarian, I know firsthand the research value of the *Weekly Report*. And I urge you to explore it as an exciting way to support your AP American Government curriculum.

Some teachers, like Dr. Spurrier, assign their students to use the *Weekly Report*. Other teachers use the *Weekly Report* primarily for their own lecture preparation. Either way, the *Weekly Report* is a unique ringside seat for American government in action.

Just one issue contains dozens of practical applications of the more than 200-year-old system of checks and balances. Our in-depth, nonpartisan coverage of the federal budget process, for example, quickly brings the separation of powers to life. CQ reporters' careful, comprehensive writing makes a difficult subject clear and understandable for all students.

We cover constitutional issues that are sure to spark lively discussion in your class — an entire special issue has been devoted to war in the Persian Gulf. Regular articles have covered the proposal to revamp the Electoral College and proposed amendments on congressional term limitations, a balanced budget and flag burning.

Our detailed, step-by-step descriptions of each week's action reveal the role of committees and the legislative process from introduction of bills through conference committee and presidential signature. And we provide extensive coverage of major civil rights issues, including affirmative action, sex discrimination and age discrimination.

Other elements of the *Weekly Report* will prove just as valuable to you and your students. CQ lists congressional committee assignments at the start of each congressional session and lobby registrations as they are received. So your students can track relationships between individual members of Congress and outside interest groups.

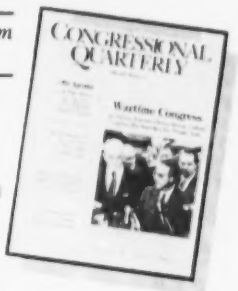
CQ's vote analyses of party unity and interest group ratings alone are worth the price of a subscription to the *Weekly Report*. But we also give you the record of all roll-call votes, the text of presidential addresses and major news conferences and incisive summaries of all major Supreme Court decisions.

In addition to this information-packed magazine, your subscription to the *Weekly Report* includes quarterly indexes and the CQ *Almanac* (a 1,000-page hardbound summary of the year in government).

Find out how the *Weekly Report* will fit right in with your AP American Government curriculum. Send for a free sample today!

## The Congressional Quarterly *Weekly Report* shows your students Congress and American government in action — every week!

*Support your AP American Government curriculum with this complete, up-to-date, objective resource*




### The Congressional Quarterly *Weekly Report* helps your AP American Government students:

- Understand how Congress handles legislative issues that cross all subject areas, including the budget, defense, foreign policy, health care, child care, housing and more
- Get overviews and details of all major legislation
- Quickly find out who voted how
- Track bills, issues and trends through Congress
- Compile voting records, bill sponsorships and lists of committee assignments for any member of the House or Senate

### Congressional Quarterly *Weekly Report* subscriptions include:

- **52 issues of the Congressional Quarterly *Weekly Report***
- **Quarterly indexes**
- **Special Reports**
- **CQ *Almanac***

**Use the form below to get your free sample!**

To get your free sample of the Congressional Quarterly *Weekly Report*, please ask the person who handles periodical purchases for your school to complete this form and return it to: Jana Steiger, Congressional Quarterly Inc., 1414 22nd St. N.W., Washington, D.C. 20037.

☐ **YES!** I'm interested in the Congressional Quarterly *Weekly Report*. Please send me a sample issue. Absolutely free and without obligation.

Name _____ Title _____

*(Please be sure that the person named handles periodical purchases at your school.)*

School _____

Address _____

City _____ State _____ ZIP _____

Phone # (for address verification) ( ) _____ Best time to call _____

**Questions?** Call Vickie Binsted at (202) 887-8665. Toll-free: 1-800-432-2250, ext. 665.

## New AP Progam

*(continued from page 2)*

TV stations.

"We incorporate graphics and video. We don't just have a talking head in front of a camera. We vary visual images using C-SPAN footage and the *Weekly Report* graphics," Spurrier says.

*Weekly Report* articles regularly include detailed graphs and charts to illustrate complex issues. These graphics are also excellent for reproduction in reports, class presentations and debate.

"We can offer a wide variety of congressional issues, right up to date, both written and visual," Spurrier explains. "It's a creative program. We have a lot of fun with it. Natalie and Lisa often work together at night to come up with new ideas and ways to use the technology."

### The essential classroom link

"Teaching Partners are the essential link between OSU teaching staff and students — the key to success," Spurrier emphasizes.

A background in political science or social sciences is helpful for Teaching Partners, but not necessary. More important, Spurrier feels, is enthusiasm and commitment, for these qualities help keep students on track at a college pace.

And students aren't the only ones who learn from the course.

"Many of our Teaching Partners are not certified in American Government — so the *Weekly Report* is a tremendous resource for them too — they are learning things themselves that they can apply to other social science courses," Spurrier reports.

While the teaching style of AP American Government by Satellite might buck tradition, the testing style does not. The OSU program includes four quizzes, three major examinations, two short papers and a final examination.

Quizzes and exams are prepared at OSU. Teaching Partners submit the students' quizzes, exams (objective and essay items), and papers to OSU for grading. Spurrier and Gentry indicate the exam and course grades students would receive in a college level course, but the final high school grade recorded for the student's AP course remains the prerogative of the Teaching Partner.

And the final grade for satellite teaching?

"Nobody claims that distance learning is as effective as classroom learning," Spurrier admits.

But with the right mix of educators, students and resources, the sky's the limit.

*For a free sample of the Congressional Quarterly* Weekly Report, *please complete and return the form on page three of this publication. Or call Vickie Binsted at (202) 887-8665. Toll free: 1-800-432-2250, ext. 665. For more information on AP American Government by Satellite, call Dr. Robert Spurrier or Natalie Gentry toll-free: 1-800-442-1447.*

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***News and ideas for AP American Government***

*Please forward to the person who teaches or administers your AP American Government program*

Advanced Placement

# AMERICAN GOVERNMENT

by Satellite

**1990-1991 (SPRING SEMESTER)**

# GUIDEBOOK

**for**

# TEACHING PARTNERS

**and**

# ADMINISTRATORS

Dr. Robert L. Spurrier, Jr.
Professor of Political Science and
Director of the Arts & Sciences Honors Program
Oklahoma State University

November, 1990

## TEACHING PARTNERS

**Please read this Guidebook and view the introductory video tape as soon as possible.**

**When your school district's subscription agreement for AP American Government by Satellite is received by ASTS, you will be provided with the 800 toll-free telephone number for the course. We suggest that you write the telephone number in this space for easy reference.**

**1 (800) _____**

**The mailing address is:**

**AP American Government by Satellite**
**401 Life Sciences East**
**Oklahoma State University**
**Stillwater, OK 74078**

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## I. USING THIS GUIDEBOOK AND THE INTRODUCTORY VIDEO TAPE

This Guidebook will be most easily understood if it is used in conjunction with the video tape entitled "Your Introduction to AP American Government by Satellite" which is available from the Arts and Sciences Teleconferencing Service (ASTS) at Oklahoma State University.

We recommend that everyone involved with the course (students, teachers, principals and superintendents, board of education members, and parents) be afforded the opportunity to view the video tape prior to the beginning of the course.

The tape also may prove useful as a counseling tool for students who wish to know more about AP American Government by Satellite prior to making the decision to enroll in the course.

If you have not received the introductory video tape for this course, contact the Arts and Sciences Teleconferencing Service (ASTS) at Oklahoma State University. The ASTS telephone number is (405) 744-7895.

## II. THE KEY TO SUCCESS: TEAMWORK FROM EVERYONE

At first glance it may seem that satellite technology is the key to AP American Government by Satellite, and there is no doubt that the technology is important. Like any other educational endeavor, however, the real key to a successful experience with this course is the people involved. The best-laid plans can lead to disaster if the wrong people are at the helm, while the right people often can bring success from a seemingly disastrous situation. Teamwork is essential to success this semester--including consistent effort by students, careful attention to the students' work by the Teaching Partner, a cooperative working relationship between the Teaching Partner and the teaching staff at Oklahoma State University, support from the school administration and the board of education, and encouragement from the students' families and the community. For this reason, the first section of this Guidebook deals with the people whose efforts will contribute to the success of this college-level course.

### A. THE STUDENT

Not every high school student is ready for the experience of a college-level course. To paraphrase (poorly, no doubt) the recruiting slogan of the United States Marine Corps, AP American Government by Satellite is "looking for a few good students." The factors to be considered in selecting students in your school for this course should include the following:

#### 1. Class Level and Maturity Level

For the most part, it is anticipated that this course will be composed of high school seniors (although outstanding juniors also may find the course suitable). In addition, the students should be mature young people who are motivated toward success, willing to attempt something new to expand their horizons, and mature enough to take responsibility for their own actions. This is not a course for immature "fault finders" who consistently seek to find others to blame when difficulties are encountered.

#### 2. Prior Record of Academic Achievement

Students selected for AP American Government by Satellite should already have compiled a record of solid academic achievement in high school. This record is most likely an indication that they have begun to develop study skills essential to advanced work in addition to being comparatively mature individuals. By no means does this mean that only students with "straight A averages" should be

encouraged to take this course, but some caution should be exercised in permitting students without a record of scholastic achievement in the course. School administrators and Teaching Partners should be aware that an AP course is not likely to be a place where a previously marginal student suddenly blossoms into a top academic achiever. While it is possible that the challenge of this course might bring about this result, the far greater likelihood is that this kind of student will not be well served by the course.

**3. Desire to Go Beyond the Normal High School Curriculum**

Students in AP American Government should have a desire to make the most of their educational opportunities by reaching beyond their normal high school curriculum to undertake study in a more advanced setting. This may be based on an interest in the academic subject matter of the course, the opportunity to obtain a "head start" on college credit through the AP examinations given by the College Board, or simply a desire to learn what a college course is like before actually entering a college or university following graduation from high school. Whatever the precise combination of factors involved for a particular student, there must be the desire for "something extra" at this stage of his or her educational career.

**4. Willingness to Participate Actively**

The learning process in AP American Government by Satellite does not call for passive reception of knowledge by the students. Like it or not, real learning involves active participation and work--perhaps a greater workload than previously expected of the student. Active participation includes careful study of the assigned reading (not just casually reading quickly-turned pages), development of a detailed course outline (a skill that can be extremely valuable in college), and interaction with other students in the course (in the classroom if more than one student is enrolled at your school and by telephone with students at other locations as well as with the OSU teaching staff). Active participation also means a willingness to ask questions--even at the risk of asking a "silly question" when the desire to learn is sincere.

## B. THE TEACHING PARTNER

There probably is no way to overestimate the importance of the Teaching Partner in satellite instruction. You are the "front line" of the course, and without your contribution the course is doomed to mediocrity (if it achieves even that level of success).

### 1. Recognizing that You are the Key to Success

One point on which you will find unanimous agreement among people involved with distance learning through ASTS is that the Teaching Partner is an absolutely essential link between the students in the classroom and the teaching staff at OSU. You are a full partner in the teaching effort, and you will be entitled to a large share of the credit for the good things which can come out of AP American Government by Satellite.

### 2. Enthusiasm for the Course and the Concept

Enthusiasm is contagious, and if the Teaching Partner and teaching staff at OSU demonstrate an enthusiastic commitment to the course it will almost certainly be reflected in the students. This means that the most successful Teaching Partners are those who are committed to the need for an AP course in American national government to better equip their students for citizenship in general and college in particular, who are willing to see more good in the benefits of distance learning than difficulties inherent in the miles between the students and OSU, and who are not easily discouraged if problems arise. While it would be ideal if Teaching Partners had a background in political science (or the social sciences more generally), personal enthusiasm and commitment are likely to be more important in generating a positive response from your students than any particular courses on the Teaching Partner's transcript.

### 3. Ability to Keep Students on Track

One of the real problems faced by many college freshmen is the tendency to procrastinate--all too often with serious academic consequences. This problem can be even greater when a high school student is participating in a college-level course, especially if "senioritis" sets in as the semester nears its conclusion. The Teaching Partner must be able and willing to keep students on track throughout the entire semester in terms of completed reading assignments, development of course outlines by the students, readiness for quizzes and examinations on the dates scheduled in the course syllabus, and submission of papers on the appropriate dates. Please resist the temptation to allow "one more day" to accomplish a task--because doing so encourages students to expect treatment that

is unlikely to be forthcoming when they enter college.

**4. Willingness to Keep Up to Date Throughout the Semester**

Political science is not a static discipline. While the constitutional basics of the American governmental system remain largely the same from year to year, the specific political figures and important issues can undergo rapid change. Last year's timely example is frequently outdated (at best) in the current semester, so the satellite presentations will be adjusted to political events as the course progresses. This means that the Teaching Partner will need to review issues of the Congressional Quarterly Weekly Report as they are received to keep abreast of political developments in the nation's capital and elsewhere.

**5. Frequent Contact with OSU Teaching Staff**

The Teaching Partner will have various routine responsibilities for the course, such as mailing examinations and student papers to OSU for grading, responding to questionnaires, and the like. This minimal level of contact is not likely to be sufficient, so we encourage Teaching Partners to write, call the toll-free number during the broadcasts, and call OSU toll-free at times when we are not on the air. (If your call reaches our answering machine at a time when we cannot respond immediately to your inquiry, please leave your question or comment and let us know the best time of the day to get back to you with a response.) You don't have to wait until you have a question. Your suggestions are welcome at any time! Remember that you are the "eyes and ears" of the teaching team in your own classroom--and the information you gather cannot help improve the course unless you communicate with the teaching staff at OSU.

## C. PRINCIPALS AND SUPERINTENDENTS

As administrators in your school system, you already have made a commitment to the AP American Government by Satellite course by approving participation by one or more of your students during the semester. In addition to this initial commitment, there are several other ways in which you can contribute to the success of this course in your school district.

### 1. Correct Staffing Decisions, Expectations, and Rewards

The selection of the Teaching Partner for AP American Government by Satellite is a crucial decision. The teacher you select should be a certified classroom teacher who has the characteristics covered in the preceding section on the Teaching Partner. Selecting a Teaching Partner simply because there is no other course for him or her to teach is an invitation to problems--but selecting a dedicated and dynamic teaching partner is a giant stride toward success. You should make it clear to the teacher you select that this is a major teaching effort, not an opportunity to view a "TV course." What you expect from the teacher should be communicated clearly, and success on the part of the Teaching Partner should be rewarded accordingly.

### 2. Proper Physical Facilities, Schedule, Equipment, and Maintenance

Your school has certain responsibilities concerning satellite receiving equipment and text materials which are outlined in Section III of this Guidebook. Proper maintenance of your equipment is crucial to a trouble-free semester. In addition, the course should be viewed "live" if at all possible if the students are to receive the maximum benefit--and this involves scheduling within your school so that students participating in AP American Government by Satellite do not encounter conflicts with their other courses during the semester. Your advance planning on these matters will help avoid problems for you students and teacher during the course.

### 3. Support for Teachers and Students

As a leader in your school district, you are in a position to encourage and support the Teaching Partner and the students in this AP course. We hope that you will visit the classroom during some of the live broadcasts and that you will keep abreast of the students' progress. Let your support for satellite instruction be well known within your school, and please feel free to contact the teaching staff at OSU at any time concerning any aspect of AP American Government by Satellite.

**4. Atmosphere Which Makes Learning the First Priority**

There are many temptations which threaten to distract students from mastering the academic subject matter presented during the semester--the primary task of AP American Government by Satellite. If not monitored closely, extracurricular activities, field trips in other classes, special school assemblies, and the like can cut into the time necessary for this course. As administrators for the school district, you have far greater authority than the Teaching Partner to prevent conflicting demands on your students' time, and we strongly encourage you to take a "hard line" on this point from the very beginning of the semester.

## D. BOARD OF EDUCATION, PARENTS, AND COMMUNITY

Members of the broader community have a role to play in fostering student success in an AP satellite course. As the policy-making body for the school district, the Board of Education can take a public stance in favor of using the latest technology to enhance the opportunities available to students in the district and in favor of rewarding administrators and teaching partners who achieve success. Parents can provide encouragement to sons and daughters as they study for the course, and they can provide a supportive environment of understanding if the demands of the course involve more "study time" which cuts into time previously available for family activities or responsibilities at home. The community as a whole can play an important role through recognition in the local media for all of those involved with AP American Government by Satellite, invitations to Teaching Partners and students to make presentations to civic clubs, and (more generally) fostering a sense of community pride that your school district is providing the opportunity for students to undertake a college course while they are still in high school. Recognition for achievements in such educational endeavors is seldom wasted--and it is almost always appreciated.

## E. THE TEACHING STAFF AT OSU

The staff members at OSU are responsible to do everything within their capabilities to make AP American Government by Satellite a success for your students. The professor for the course (Dr. Robert Spurrier) has the primary responsibility for developing complete and current course material, preparing satellite presentations which encourage learning by the use of a variety of audio and visual means, constructing and evaluating quizzes and examinations, and generally supervising the production and delivery of the course. The satellite instruction specialist (Ms. Natalie Gentry) is responsible for assisting the professor with development of the course and with on-camera presentation of the material, for maintaining on-going

communication with the Teaching Partners, and for assuring timely return of materials submitted to OSU for grading. The producer-director for the course (Ms. Lisa Allen) and the other professional staff at Educational Television Services on the OSU campus have the responsibility for the technical aspects of commercial-quality broadcasts during the semester. An 800 toll-free telephone number makes it easy for students, Teaching Partners, and other interested persons to contact the AP American Government by Satellite office on a 24-hour basis.

## III. EQUIPMENT AND MATERIALS

### A. ELECTRONIC EQUIPMENT AND FACILITIES

1. a satellite receiving system ("dish") similar to that used by many homeowners

2. a color television monitor (at least 25" diagonal)

3. a videotape player/recorder to tape broadcasts for later review

4. a quiet classroom, free from other distractions, in which the students may participate in the course on a "live" basis on Mondays, Wednesdays, and Fridays

5. a telephone in the classroom so that students can place calls during the live broadcasts (a speakerphone is preferred)

6. adequate seating and desk/table space for each student to take extensive class notes during the live broadcasts

7. [OPTIONAL] one or more personal computers (IBM or Apple) in the classroom on which students may use the software available from the publisher for review and practice questions [Check with Harper and Row for additional details about the computer software which may be obtained directly from the publisher.]

## B. TEXTBOOK AND RESOURCE MATERIALS

1. Primary Textbook: Stephenson, Bresler, Friedrich, and Karlesky, American Government (Harper and Row, 1988) ISBN 0-06-040947-9

Order from: HarperCollins Publishers Phone: (212) 207-7000
10 E. 53rd Street
New York, NY 10022

-- one copy for each student $30.00 each = $_____

Supplemental materials available at no cost from Harper and Row:

2. Election '88 (guide to accompany American Government), **no charge**
(Harper and Row, 1989) ISBN 0-06-360324-1

-- one copy for each student

3. Elowitz, Study Guide (to accompany American Government), **no charge**
(Harper and Row, 1988) ISBN 0-06-041915-6

-- one copy for TEACHING PARTNER ONLY!

4. Congressional Quarterly Weekly Report (annual subscription for district at special reduced rate for this course ) $170.00

Order from: Congressional Quarterly, Inc. Phone: (800) 432-2250, ext. 665
ATTN: Vickie Binsted Ask for: Vickie Binsted
1414 22nd Street, N.W.
Washington, D.C. 20037

-- one subscription per class, beginning as early in academic year as possible to build a reference set for students in the spring

5. The United States Government Manual $21.00
and the
6. Congressional Directory $15.00

Order both books from:

Superintendent of Documents Phone: (202) 783-3238
U.S. Government Printing Office
Washington, D.C. 20402

-- one copy of each book per class

## C. OSU-PRODUCED SUPPLEMENTARY MATERIALS

From time to time, the AP American Government by Satellite office will mail supplementary items to the schools (no charge from OSU) to be duplicated and distributed to the students in the course. Included on the next three pages of this Guidebook is a sample of such material--an edited version of the United States Supreme Court's opinion in Brown v. Board of Education (1954).

# Brown v. Board of Education (1954)

Mr. Chief Justice Warren delivered the opinion of the Court.

These cases come to us from the States of Kansas, South Carolina, Virginia, and Delaware. They are premised on different facts and different local conditions, but a common legal question justifies their consideration in this consolidated opinion.

**[GOVERNMENT BY SATELLITE NOTE: The plaintiff in a court case is the person, group, corporation, government agency, etc. who filed the case--the "offense" in the case. The defendant is the person, group, corporation, government agency, etc. against whom the case has been filed--the "defense" in the case.]**

In each of the cases, minors of the Negro race, through their legal representatives, seek the aid of the courts in obtaining admission to the public schools of their community on a nonsegregated basis. In each instance, they have been denied admission to schools attended by white children under laws requiring or permitting segregation according to race. This segregation was alleged to deprive the plaintiffs of the equal protection of the laws under the Fourteenth Amendment. In each of the cases other than the Delaware case, a three-judge federal district court denied relief to the plaintiffs under the so-called "separate but equal" doctrine announced by this Court in Plessy v. Ferguson. Under that doctrine, equality of treatment is accorded when the races are provided with substantially equal facilities, even though these facilities are separate. In the Delaware case, the Supreme Court of Delaware adhered to that doctrine, but ordered that the plaintiffs be admitted to the white schools because of their superiority to the Negro schools.

**[GOVERNMENT BY SATELLITE NOTE: The relevant clause of Section 1 of the Fourteenth Amendment provides: "No State shall . . . deny to any person within its jurisdiction the equal protection of the laws." For the full text of the 14th Amendment, see page 645 in your text.]**

The plaintiffs contend that segregated public schools are not "equal" and cannot be made "equal," and that hence they are deprived of the equal protection of the laws. Because of the obvious importance of the question presented, the Court took jurisdiction. Argument was heard in the 1952 Term, and reargument was heard this Term on certain questions propounded by the Court.

Reargument was largely devoted to the circumstances surrounding the adoption of the Fourteenth Amendment in 1868. It covered exhaustively consideration of the Amendment in Congress, ratification by the states, then existing practices in racial segregation, and the views of proponents and opponents of the Amendment. This discussion and our own investigation convince us that, although these sources cast some light, it is not enough to resolve the problem with which we are faced. At best, they are inconclusive. The most avid proponents of the post-War Amendments undoubtedly intended them to remove all legal distinctions among "all persons born or naturalized in the United States." Their opponents, just as certainly, were antagonistic to both the letter and the spirit of the Amendments and wished them to have the most limited effect. What others in Congress and the state legislatures had in mind cannot be determined with any degree of certainty.

An additional reason for the inconclusive nature of the Amendment's history, with respect to segregated schools, is the status of public education at that time. In the South, the movement toward free common schools, supported by general taxation, had not yet taken hold. Education of white children was largely in the hands of private groups. Education of Negroes was almost





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nonexistent, and practically all of the race were illiterate. In fact, any education of Negroes was forbidden by law in some states. Today, in contrast, many Negroes have achieved outstanding success in the arts and sciences as well as in the business and professional world. It is true that public education at the time of the Amendment had advanced further in the North, but the effect of the Amendment on Northern States was generally ignored in the congressional debates. Even in the North, the conditions of public education did not approximate those existing today. The curriculum was usually rudimentary; ungraded schools were common in rural areas; the school term was but three months a year in many states; and compulsory attendance was virtually unknown. As a consequence, it is not surprising that there should be so little in the history of the Fourteenth Amendment relating to its intended effect on public education.

In the first cases in this Court construing the Fourteenth Amendment, decided shortly after its adoption, the Court interpreted it as proscribing all state-imposed discriminations against the Negro race. The doctrine of "separate but equal" did not make its appearance in this Court until 1896 in the case of Plessy v. Ferguson . . . involving not education but transportation. American courts have labored with the doctrine for over half a century. [Chief Justice Warren then recounts six earlier cases dealing with education, none of which presented the question of whether the "separate but equal" doctrine was appropriate in public education at the grade school or high school level. He goes on to note that in the cases currently under consideration the facilities and curricula available to the students have been equalized or are in the process of being equalized.] Our decision, therefore, cannot turn on merely a comparison of these tangible factors in the Negro and white schools in each of the cases. We must look instead to the effect of segregation itself on public education.

In approaching this problem, we cannot turn the clock back to 1868 when the Amendment was adopted, or even to 1896 when Plessy v. Ferguson was written. We must consider public education in the light of its full development and its present place in American life throughout the Nation. Only in this way can it be determined if segregation in public schools deprives these plaintiffs of the equal protection of the laws.

Today, education is perhaps the most important function of state and local governments. Compulsory school attendance laws and the great expenditures for education both demonstrate our recognition of the importance of education to our democratic society. It is required in the performance of our most basic public responsibilities, even service in the armed forces. It is the very foundation of good citizenship. Today it is a principal instrument in awakening the child to cultural values, in preparing him for later professional training, and in helping him to adjust normally to his environment. In these days, it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education. Such an opportunity, where the state has undertaken to provide it, is a right which must be made available on equal terms.

We come then to the question presented: Does segregation of children in public schools solely on the basis of race, even though the physical facilities and other "tangible" factors may be equal, deprive the children of the minority group of equal educational opportunities? We believe that it does.

[After a brief discussion of earlier cases dealing with higher education and the intangible burdens of segregation, the Chief Justice returned to the public schools.] To separate them [the minority children] from others of similar age and qualifications solely because of their race generates a feeling of inferiority as to their status in the community that may affect their hearts and minds in a way unlikely ever to be undone. * * * [T]his finding is amply supported by modern [psychological] authority. Any language in Plessy v. Ferguson contrary to this finding is rejected.

We conclude that in the field of public education the doctrine of "separate but equal" has no place. Separate educational facilities are inherently unequal. Therefore, we hold that the plaintiffs and

others similarly situated for whom the actions have been brought are, by reason of the segregation complained of, deprived of the equal protection of the laws guaranteed by the Fourteenth Amendment. [The Chief Justice concluded the opinion by noting that there was no need to consider other constitutional grounds to challenge school segregation, and the Court ordered the attorneys to return the following year to present further arguments concerning the ways in which the decision should be implemented through the lower courts.]

It is so ordered.

## IV. THE NATURE OF THE COURSE

AP American Government by Satellite is a college-level introductory political science course dealing with government and politics in the United States. The pace of instruction, depth of material, and performance level expected of the students will be similar to that found in the introductory course (POLSC 1013, American Government) at Oklahoma State University. Students will be expected to keep current with development on the national political scene and relate these developments to materials in their texts and the televised lectures. Congressional Quarterly Weekly Report is required for this purpose, and we recommend that it become a permanent addition to your school's library following completion of the course this semester.

The course is designed to be a five-day-a-week class. There will be three presentations each week by satellite (on Mondays, Wednesdays, and Fridays). New material will be presented in each of the satellite broadcasts, and it is important that these be viewed on a "live" basis. Student interaction via the toll-free 800 telephone line will be encouraged throughout the live broadcasts--as well as at other times during the day.

Quizzes and examinations will be prepared at Oklahoma State University and mailed to the Teaching Partner. These quizzes and examinations will be administered by the Teaching Partner on Tuesdays (every other week), and the professor will discuss the correct answers with the students in the Wednesday televised session--so that feedback will be immediate and so that, if necessary, the students can raise questions about the items on the quizzes and examinations as soon as possible after their administration. The Teaching Partners will be responsible for grading the objective items, while the essay items will be mailed to OSU for grading. Because anyone with a satellite receiver can tune in on the video signal of AP American Government by Satellite, we must assume that the quiz or examination items will become public knowledge as soon as these items are discussed during the Wednesday broadcasts.

The teaching staff at OSU will indicate the examination and course grades which the students would have received in a college-level course, using the criteria contained in the course syllabus. The final high school grade recorded for the student's AP course in high school remains the prerogative of the Teaching Partner.

Because many of the students participating in AP American Government by Satellite will be interested in taking the Advanced Placement examination offered by the College Board, care has been taken to incorporate detailed coverage of the five areas covered on that examination: constitutional underpinnings of United States government, political beliefs and behaviors, political parties and interest

groups, institutions and policy processes of national government, and civil rights and civil liberties. The expanded course syllabus found in the next section of this Guidebook provides a day-by-day schedule of topics for the satellite broadcasts along with brief statements of learning objectives on a weekly basis.

To be successful in this course, students must learn to assimilate material from various sources. An essential tool in this process is the development of a personalized written course outline by each student. With the assistance of the Teaching Partner, it is anticipated that students will use at least a portion of the Tuesday or Thursday class period each week developing their own written outlines of the course. Because of the importance attached to this effort by the AP American Government by Satellite teaching staff at OSU, the first class session by satellite will deal with expectations in a college course and the importance of developing a course outline--along with some suggestions on how to develop an effective outline.

It is suggested that Teaching Partners use the Study Guide available from the publisher of the basic textbook (HarperCollins) to give practice quizzes in the weeks in which an actual quiz or examination is not called for in the course syllabus. This will help keep the students up-to-date, and it will be an asset in their preparation for the actual quizzes and examinations in the course. (In those districts with computers available to the students for the course, software is available from the publisher which contains test items which may be used for practice quizzes and for individual self-testing by the students.)

In addition to using a portion of the Tuesday and Thursday class periods for outline development, practice quizzes, and actual quizzes and examinations, we suggest that students be encouraged to enter into discussion (perhaps even structured debates) on current issues related to the subject matter under consideration. If the discussion indicates a problem in terms of student understanding of a particular concept or issue, the Teaching Partner should feel free to play back the video tape of the satellite program involved to help the students gain a better grasp of the material--or encourage them to call the AP Government by Satellite office at OSU for additional information.

## V. EXPANDED COURSE SYLLABUS

This section of the Guidebook provides an expanded course syllabus for the Teaching Partner for AP American Government by Satellite. In addition to the information contained in the students' course syllabus, this section includes weekly learning objectives to provide the Teaching Partner with an overview of the instructional goals for the week.

### Course Syllabus for AP AMERICAN GOVERNMENT BY SATELLITE

**Dr. Robert L. Spurrier, Jr. -- Ms. Natalie Gentry**
**Oklahoma State University**

This is an introductory college-level course about government and politics in the United States. In most colleges and universities you will find such a course taught by the Department of Political Science. A number of colleges and universities require such a course for graduation, while many other institutions allow students to use credit in the introductory course in American government and politics to be used to satisfy a portion of the requirement for credit in the social sciences. We hope that you will take the Advanced Placement examination offered through the College Board to qualify for college credit. Whether a particular college or university accepts AP credit, and how that credit may be counted toward degree requirements, is a matter decided by that institution--not by the College Board.

The teaching staff of AP American Government by Satellite and the Teaching Partner in your high school will evaluate your work and indicate the grade you would have received if this were an actual college course, using the criteria given below. Your final course grade in your high school AP course remains the responsibility of your Teaching Partner.

| | |
|---|---|
| Four Tuesday Short Quizzes (25 points each) | 100 points |
| Three Tuesday Major Examinations (100 points each) | 300 points |
| Two Short Papers (75 points each) | 150 points |
| Final Examination (150 points) | 150 points |
| TOTAL POINTS | 700 points |

Grades assigned at OSU will use the following scale: 630-700 = A; 560-629 = B; 490-559 = C; 420-489 = D; 0-419 = F (without any "rounding" of grades). Because this is a college course, there is no provision for "extra credit" work.

Four **TUESDAY SHORT QUIZZES** will be given on the dates indicated below. They will be objective in nature (multiple-choice questions and short-answer items), and they will cover the topics indicated.

Three **TUESDAY MAJOR EXAMINATIONS** will be given on the dates indicated below. They will combine objective (multiple-choice) questions with one or more essay questions, and they will cover

all of the material covered to that point in the course.

The **FIRST SHORT PAPER** will be due (postmarked) on Friday, March 1. This paper should be typewritten (or prepared on a word processing system) and be approximately four pages long (8-1/2 by 11" paper, with margins no larger than one inch). Each student in the class will select a different federal executive-branch agency from The United States Government Manual and write about the history of the agency, its current major officers, its funding in the current budget year, and how this agency affects the student's home state. It is suggested that students contact their agencies by telephone or mail early in the semester to begin obtaining information. In addition, Congressmen and Senators may be able to provide additional information about the agency selected by the student.

The **SECOND SHORT PAPER** will be due (postmarked) on Friday, April 26. This paper should be typewritten (or prepared on a word processing system) and be approximately six pages long (8-1/2 by 11" paper, with margins no larger than one inch). Each student is to select an issue of governmental policy and discuss the manner in which the federal government has been involved with the issue during the past year, the activities of political interest groups with regard to the issue, and the student's personal assessment of the activity of the federal government. [This paper may not make use of the same information used for the first short paper, and the student should not select a policy area in which the agency chosen for the first short paper is a major factor.]

The **FINAL EXAMINATION** will combine a limited number of objective (multiple choice) questions with one or two broad essay questions covering the course as a whole.

**WEEK 1 - GETTING STARTED: SOME BASIC QUESTIONS**
[Chapter 1 & Chapter 2, pages 18-44]

The learning objectives for Week 1 include understanding the pacing of a college course, the importance of careful note-taking in class, and how and why an individually-prepared course outline is essential. In addition, students should be able to: (1) categorize governmental systems on the basis of amount of control over their citizens and on the basis of the responsibility of the governmental officials, explain why the United States is categorized as being a limited democracy, and place the governmental system of the United States in world context; (2) explain how different views of human nature lead to different types of governmental systems; (3) explain the British origins of our constitutional-legal structure, the role played by written documents (colonial charters, state constitutions, and the Articles of Confederation) in the nation's formative years; and (4) indicate the difficulties of government under the Articles of Confederation which led to the calling of the Constitutional Convention in Philadelphia.

**Monday, January 7 - What Am I Doing Here? Success in a College Course**
The Pacing of a College Course
Learning as an Adult--and Assuming Responsibility
Reading a College-level Text
Taking Class Notes
Asking, Asking, Asking (Don't Be Afraid to Ask Questions!!!)
Developing Your Course Outline-Lifeline
Periodic Reviews on Your Own

**Wednesday, January 9 - Assumptions About Human Nature and the Resulting Systems of Government**

**Friday, January 11 - Historical Background for the Constitutional Convention**





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**WEEK 2 - THE BASIC RULES OF THE GAME: THE U.S. CONSTITUTION**
[Chapter 2, pages 45-54 and Chapter 3]

The learning objectives for Week 2 include being able to: (1) describe major features of the Constitution including separation of powers, checks and balances, majority rule, and minority rights; (2) identify key compromises at the Constitutional Convention which were essential to the formation of the national government; (3) explain the process by which the Constitution may be amended and categorize the 26 amendments thus far added to the Constitution; (4) describe three different systems of division of governmental powers (unitary system, confederation, and federal system); and (5) illustrate how the authority of the national government in the United States has been increased in the 20th century--especially by fiscal means. [Note: Throughout the semester the student will be expected to be able to illustrate principles learned in the course with current examples from Congressional Quarterly Weekly Report and from the televised lectures. This is a "standing learning objective" assumed to be included in each of the sets of weekly learning objectives which follow in this expanded course syllabus.]

**Monday, January 14 - Key Elements of the United States Constitution**

**Wednesday, January 16 - Amending the Constitution**

**Friday, January 18 - Federalism**

**WEEK 3 - CONGRESS: THE FIRST BRANCH**
[Chapter 12]

The learning objectives for Week 3 include being able to: (1) give the constitutional qualifications for membership in the House of Representatives and the Senate; (2) locate in the Constitution and explain major powers of Congress; (3) identify the key leadership positions in each house of Congress and explain how these leaders are selected; (4) explain the importance of congressional committees in the legislative process; (5) explain the workings of the seniority system; (6) outline the steps in the process by which a bill becomes a law; and (7) indicate the importance of the House Rules Committee and the role of the filibuster in the Senate.

**Monday, January 21 - You Can't Tell the Players Without a Scorecard: Members of the House and Senate**

*[Quiz #1, over weeks 1 and 2, to be given in class on Tuesday, January 22]*

**Wednesday, January 23 - The Structure of Congressional Power**
Analysis of Quiz #1 at beginning of broadcast

**Friday, January 25 - From Bill to Law: The Legislative Steeplechase**

**WEEK 4 - THE PRESIDENCY IN AMERICAN POLITICS**
[Chapter 13]

The learning objectives for Week 4 include being able to: (1) describe the constitutional qualifications for office for the President and Vice President; (2) locate in the Constitution and describe the major powers of the presidency; (3) explain the importance of the presidential power of appointment; (4) discuss contemporary examples of use of the presidential veto power; (5) explain the function of the President as Commander-in-Chief; (6) discuss how differing views of the presidency have led Presidents to behave differently in office; and (7) contrast a presidential system with a parliamentary system of government.

**Monday, January 28 - Policy Areas of Presidential Dominance**

**Wednesday, January 30 - Conflicts with Congress**

**Friday, February 1 - The Personality of the President: Does It Really Matter Who Sits in the Oval Office?**

**WEEK 5 - THE FEDERAL BUREAUCRACY: WHO'S IN CHARGE HERE?**
[Chapter 14]

The learning objectives for Week 5 include being able to: (1) define the term "bureaucracy" and explain how its original meaning differed from the way the term currently is used in everyday conversation; (2) describe the ways in which the Executive Office of the President has expanded into its own bureaucracy; (3) explain how federal Civil Service regulations were developed to combat the "spoils system" and had the unintended consequence of making the bureaucracy less responsive to the democratic process; (3) discuss the role of the federal independent regulatory agencies and explain their quasi-legislative and quasi-judicial powers; and (5) explain the "policy subsystems" often formed by executive-branch agencies, congressional committees, and constituency groups.

**Monday, February 4 - Is "Bureaucracy" a Dirty Word?**

*[Exam #1, over weeks 1 through 4, to be given in class on Tuesday, February 5]*

**Wednesday , February 6 - Federal Regulatory Agencies: Mini-Governments in Action**
Analysis of Exam #1 at beginning of broadcast

**Friday, February 8 - Balancing the Bureaucrats**

**WEEK 6 - THE FEDERAL JUDICIARY: THE LEAST DANGEROUS BRANCH?**
(Chapter 15)

The learning objectives for Week 6 include being able to: (1) locate in the Constitution and explain the basic powers of the federal judiciary; (2) describe the origins of the power of judicial review in Marbury v. Madison and the role played by Chief Justice John Marshall in enhancing the authority of the federal judiciary; (3) describe the organizational structure of the three levels of general-jurisdiction federal courts; (4) explain the role played by Congress in modifying the structure and jurisdiction of the federal judiciary; and (5) explain the differences in function between courts of original jurisdiction and appellate-jurisdiction courts.

**Monday, February 11 - The Power of Judicial Review**

**Wednesday, February 13 - The Organization of the Federal Judiciary**

**Friday, February 15 - How the Federal Courts Operate**

**WEEK 7 - FUNDAMENTAL CIVIL LIBERTIES**
(Chapter 4, pages 91-108)

The learning objectives for Week 7 include being able to: (1) list the rights included in the First Amendment and give practical examples of these rights; (2) explain the major doctrines which have been utilized by the Supreme Court in the areas of the freedoms of speech, press, and assembly; (3) explain the difference between the Establishment Clause and the Free Exercise Clause of the First Amendment with regard to religious freedom; and (4) explain the importance of the Supreme Court's interpretation of the Due Process Clause of the Fourteenth Amendment to selectively incorporate most of the provisions of the Bill of Rights and thereby limit state governments as well as the national government.

**Monday, February 18 - Constitutional Rights and Liberties: An Overview**

*[Quiz #2, over weeks 5 and 6, to be given in class on Tuesday, February 19]*

**Wednesday, February 20 - Freedom of Speech, Press, and Assembly**
Analysis of Quiz #2 at beginning of broadcast

**Friday, February 22 - Freedom of Religion: Establishment and Free Exercise**

**WEEK 8 - FUNDAMENTAL CIVIL LIBERTIES (CONTINUED)**
[Chapter 4, pages 109-124]

The learning objectives for Week 8 include being able to: (1) locate in the Constitution and explain basic rights of persons accused of crimes including trial by jury, assistance of counsel, presumption of innocence, and privilege against self-incrimination; (2) distinguish between procedural and substantive rights; (3) discuss how the Supreme Court has created a "right to privacy" although those words appear nowhere in the Constitution; (4) present the arguments used for and against the Supreme Court's abortion decision in Roe v. Wade; and (5) explain how in a democratic society the will of the majority may properly be restrained by the rights of the minority.

**Monday, February 25 - Constitutional Rights of the Accused**

**Wednesday, February 27 - Is There Really a "Right to Privacy?"**

**Friday, March 1 - Constitutional Civil Liberties in Perspective**

**WEEK 9 - CIVIL RIGHTS AND THE STRUGGLE FOR EQUALITY**
[Chapter 5]

The learning objectives for Week 9 include being able to: (1) discuss the inherent conflict between the principles of liberty and equality if either principle is carried to its logical extreme; (2) explain how the Civil War Amendments are instrumental in the struggle for legal equality among the races; (3) explain how the Supreme Court has utilized the Equal Protection Clause of the Fourteenth Amendment to declare racial segregation by governmental agencies to be unconstitutional, with particular attention to the field of education; (4) discuss how other disadvantaged groups have been able to utilize the federal courts to gain protection of their rights; and (5) give examples of the way in which federal legislation has dealt with providing greater equality for minority groups and women.

**Monday, March 4 - The Inherent Conflict Between Liberty and Equality**

*[Exam #2, over weeks 1 through 8, to be given in class on Tuesday, March 5]*

**Wednesday, March 6 - The Movement Toward Racial Equality**
Analysis of Exam #2 at beginning of broadcast

**Friday, March 8 - Other Disadvantaged Groups**

**THERE ARE NO BROADCASTS DURING WEEK OF MARCH 11-15.**

**WEEK 10 - THE PEOPLE, THE POLITICIANS, AND THE POLICIES OF GOVERNMENT**
[Chapters 6 and 19]

The learning objectives for Week 10 include being able to: (1) discuss the differences between capitalistic, socialistic, and communist governmental systems; (2) describe several major types of "positive benefits" received from government in the United States--including Social Security, public education, farm price supports, etc.; (3) describe several types of "negative benefits" sought by groups which primarily seek to be "left alone" by the government--such as the National Rifle Association, the American Medical Association, etc.; and (4) explain how the seeking of "positive" and "negative" benefits can lead to policy conflict among groups.

**Monday, March 18 - How Much Should Government Do?**

**Wednesday, March 20 - Governmental Policy in the Form of "Positive Benefits"**

**Friday, March 22 - Governmental Policy in the Form of "Negative Benefits"**

**WEEK 11 - PEOPLE, PARTICIPATION, AND THE POLITICAL PROCESS**
[Chapters 7 and 11]

The learning objectives for Week 11 include being able to: (1) define political ideology; (2) explain the different attitudes toward government held by liberals and conservatives in the United States; (3) explain the major forces in American life which affect the political socialization of the individual; (4) discuss and evaluate the level of political knowledge of the American electorate; and (5) indicate the ways in which individuals may participate in the political process--ranging from engaging in political discussions to holding governmental office.

**Monday, March 25 - Political Ideologies in American Democracy**

*[Quiz #3, over weeks 9 and 10, to be given in class on Tuesday, March 26]*

**Wednesday, March 27 - Political Opinion: What Do We Know About Politics?**
Analysis of Quiz #3 at beginning of broadcast

**Friday, March 29 - Political Participation: Why Bother?**

**WEEK 12 - ORGANIZED POLITICAL EFFORTS**
(Chapters 8 and 9)

The learning objectives for Week 12 include being able to: (1) define and distinguish between political interest groups and political parties; (2) discuss methods used by political interest groups to affect public policy decisions; (3) explain the roles played by political parties in the United States; (4) distinguish between major and minor political parties--and assess the impact of each on the American governmental system; and (4) place the United States in world context in terms of political party systems--one-party, two-party, and multi-party systems.

**Monday, April 1 - Political Interest Groups**

**Wednesday, April 3 - Political Parties**

**Friday, April 5 - Political Parties (Continued)**

**WEEK 13 - VOTING AND NATIONAL ELECTIONS**
(Chapter 10 and '88 Election Supplement)

The learning objectives for Week 13 include being able to: (1) explain the constitutional mechanism of the electoral college for selecting the President and Vice President; (2) discuss the process by which major parties nominate candidates for the presidency; (3) discuss the relative advantages, disadvantages, and strategies typical of Democratic and Republican candidates for the presidency; (4) evaluate the additional resources of an incumbent president seeking re-election; (5) discuss the financing of the presidential election; and (6) explain the nomination and general election process with regard to members of the House of Representatives and the Senate.

**Monday, April 8 - The Great Race: Seeking the Presidency**

*[Exam #3, over weeks 1 through 12, to be given in class on Tuesday, April 9]*

**Wednesday, April 10 - The Great Race (continued)**
Analysis of Exam #3 at beginning of broadcast

**Friday, April 12 - Legislative Elections: Running for the House and the Senate**

**WEEK 14 - GOVERNMENT AND PUBLIC POLICY**
(Chapters 16 and 20)

The learning objectives for Week 14 include being able to: (1) identify the key actors in the public policy process; (2) discuss the relative powers of Congress, the President, and the federal judiciary in influencing public policy; (3) discuss key elements of foreign and defense policy in light of changing world conditions; and (4) demonstrate that foreign and defense policy issues cannot be fully analyzed without placing them in the context of domestic policy in the United States.

**Monday, April 15 - Government and Public Policy in General**

**Wednesday, April 17 - Foreign and Defense Policies [Part I]**

**Friday, April 19 - Foreign and Defense Policies [Part II]**

**WEEK 15 - GOVERNMENT AND MONEY: OF TAXATION AND ECONOMIC POLICY**
[Chapters 17 and 18]

The learning objectives for Week 15 include being able to: (1) discuss the federal government's increasingly important role in the national economy; (2) explain the incremental nature of the federal budgetary process; (3) explain the growth of the federal budget deficit and discuss efforts such as the Gramm-Rudman-Hollings law to solve the problem; and (4) analyze how federal taxing and spending policies are used to secure both economic and non-economic policy goals.

**Monday, April 22 - The Federal Budgetary Process**

*[Quiz #4, over weeks 13 and 14, to be given in class on Tuesday, April 23]*

**Wednesday, April 24 - Deficits, Deficits, Deficits!!!**
Analysis of Quiz #4 at beginning of broadcast

**Friday, April 26 - When Is a Tax Not a Tax?**

**WEEK 16 - COURSE SUMMARY AND CONCLUSION**

The learning objectives for Week 16 include being able to: (1) complete the student's individual course outline for AP American Government by Satellite; (2) synthesize material from the televised class sessions, textbook, and resource materials into a meaningful whole; (3) discuss the topic of American government in the context of the five areas covered on the Advanced Placement examination in United States Government and Politics--constitutional underpinnings of United States government, political beliefs and behaviors, political parties and interest groups, institutions and policy processes of national government, and civil rights and civil liberties.

**Monday, April 29 - Course Summary [Part I]**

**Wednesday, May 1 - Course Summary [Part II]**

*[Final Examination, over entire course, to be given in class on Thursday, May 2]*

**Friday, May 3** - Analysis of Final Examination

## VI. SAMPLE QUIZ AND EXAMINATION ITEMS

**This section of the Guidebook presents questions of the type which will be utilized in AP American Government by Satellite. The questions are based on two sample program video tapes which are available from the ASTS Office at Oklahoma State University. For more information about these tapes, please call (405) 744-7895.**

1. The most recently ratified amendment to the United States Constitution dealt with: (A) sex discrimination; (B) providing congressional representation for the District of Columbia; (C) the 18-year-old vote; (D) limiting the President to two terms of office; (E) abolishing the poll tax.

2. Which of the following has NOT been a type of constitutional amendment ratified in the Twentieth Century: (A) expanding the power of the national government; (B) expanding the rights of individuals; (C) correcting technical flaws in the Constitution; (D) expanding the power of the states by limiting the power of the national government; (E) none of the above.

3. Which of the following combination of constitutional proposal and raftification methods has been used most frequently: (A) proposal by 2/3 vote of both houses of Congress and ratification by the legislatures of 3/4 of the states; (B) proposal by 2/3 vote in both houses of Congress and ratification by special conventions in 3/4 of the states; (C) proposal by a special convention called by Congress in response to petitions from legislatures of 2/3 of the states and ratification by the legislatures of 3/4 of the states; (D) proposal by a special convention called by Congress in response to petitions from legislatures of 2/3 of the states and ratification by special conventions in 3/4 of the states; (E) none of the above, because the combinations indicated in "A" and "B" have been used an equal number of times.

4. The importance of the United States Supreme Court's decision in Brown v. Board of Education (1954) concerns: (A) desegregation of the public schools; (B) the principle of one-person, one-vote; (C) absolute freedom of speech and press; (D) abortion rights; (E) invalidation of the federal income tax.

5. The "separate but equal" doctrine used in the past by the Suprem Court dealt with: (A) foreign aid appropriations to communist and non-communist nations; (B) segregation by race which was required by law; (C) sex education of boys and girls in public schools; (D) voting in primary elections for Democratic and Republican candidates for Congress; (E) the principle of one-person, one-vote.

6. Which of the following judicial remedies may be used by a federal district court judge to dismantle an unconstitutional pattern of racial discrimination in public schools: (A) bus transportation of students; (B) reassignment of teachers; (C) redrawing school attendance zones within a school district; (D) requiring the school board to implement new taxes to pay for desegregation efforts; (E) all of the above.

7. Discuss the process by which the Constitution of the United States may be amended, including both the proposal and ratification stages, and then indicate four categories of amendments while giving an example of each and explaining why your example belongs in this particular category.

8. Discuss the respective roles of the Supreme Court and Congress in the movement toward racial equality in the United States in the 20th Century, and explain why the Supreme Court was able to outlaw public school segregation in 1954 while Congress was not able to pass a major civil rights law in the 20th Century until 1964.

## VII. ABOUT THE AP EXAMINATION

The examination by which students receive Advanced Placement credit for United States Government and Politics is administered by the College Board. AP credit is not earned by performance on the examinations administered by the Teaching Partner in AP American Government by Satellite.

We strongly recommend that the Teaching Partner contact the school principal to be certain that the school has returned the "Advanced Placement Participation Form" to the College Board Office--or that it will be returned no later than the first of April.

We also encourage you to contact the College Board as soon as possible to receive the information booklets about the AP examination in United States Government and Politics.

For additional information about the College Board's AP examinations, contact:

AP Services
P.O. Box 6671
Princeton, NJ 08541-6671

(215) 750-8300

MIND EXTENSION UNIVERSITY,
*May 8, 1991.*

HON. EDWARD M. KENNEDY,
*Committee on Labor and Human Resources,*
*U.S. Senate,*
*Washington, DC 20510-6300.*

DEAR SENATOR KENNEDY: Thank you, Senator Kennedy, for the opportunity to address the questions that were raised following my testimony concerning the Star Schools' project before the Subcommittee on Arts, Education and Humanities. We greatly appreciate the opportunity to share our experiences and thoughts on distance education with you and the Committee.

1. As you know, our proposed reauthorization legislation tries to encourage greater business involvement by giving a priority to Star Schools' applicants which include a telecommunications entity willing to donate in-kind services to the networks. Will this do the trick?

A. Our experience in distance education, and the experience of TI-IN, our partner in the delivery of secondary school classes and one of the first Star School project recipients, does support the premise that the donation of equipment or technology necessarily achieves the desired effect of encouraging wider application of distance education in America's schools.

As my testimony indicated, easily accessible distribution systems are already in existence. The barriers a school faces in taking advantage of distance education involves funding for the programming, or software, not the hardware.

Previous Star Schools' projects have demonstrated that giving equipment and programming free to schools did not translate into long-term adoption of distance education services. For example, the TI-IN United Star Network Project included TI-IN Network, a private enterprise which donated over 8 hundred hours of Staff Development. This programming service was taken for granted by many of the Star Schools recipients. Of the schools that used the service, few had funds or a financial plan to participate in the long-term use of Staff Development.

In addition, TI-IN United Star Network used Star Schools' funding to equip 316 sites. Each identified school site was provided satellite-receiving equipment at no cost to them. In a few cases, schools were reluctant to take the equipment package regardless of whether it was free. Other schools took the free equipment but had no long-term implementation plans. Once again, most schools had difficulty financially supporting the real costs related to distance learning activities after the funding ended.

The donation of satellite or video equipment by private enterprise or a telecommunications entity can be helpful to potential sites for distance education. For example, I spoke about Cable In The Classroom, an industry initiative to make cable service available to every accredited middle and secondary school in the country passed by cable. This creates a tremendous and accessible video pathway for delivering distance education programming and other forms of instructional television.

Accordingly, we would recommend that the Committee assign a priority to Star School applicants that will use the funding for the development of distance education programming. This will stimulate the creation of additional distance education programs and enable financially-troubled schools to pay more modest sums to utilize them.

2. What else can we do to increase involvement by cable companies in distance learning?

A. Congressional encouragement and support for the cable industry's commitment to provide educational cable programming to America's schools would serve as an important catalyst for the Cable In The Classroom initiative. It would also be vitally important for ensuring the success of cable program networks, like ME/U, that are solely dedicated to carrying educational programming.

ME/U is unique in serving as the only programming network available to cable operators that offers accredited distance education programs for schools. But competition for carriage on cable systems is keen. There are more than 100 national and regional cable networks at the present time and the average cable system has fewer than 54 channels, which must also accommodate local broadcast and access channels. Because cable operators respond to local market demand for programming, we have a 2-fold mission of acquainting the industry with its potential as a conduit for distance learning and, at the same time, familiarizing the marketplace with the availability of distance education programs.

ME/U is available to the cable industry for a few pennies a month per customer. As its growth would suggest, the industry is increasing its commitment to offering

education networks like ours. In so doing, they are becoming the facilitators for distance education in their communities.

The current Congress has several bills concerning the cable industry currently under consideration. None of them takes into account the investment that cable operators have made in providing cable service to schools. And none of them takes into account the investment that cable program networks have made in acquiring, producing and delivering instructional or distance education programs. I would strongly urge this Committee to take the lead in recognizing the cable industry for its commitment and encourage it to more fully utilize its potential, through the allocation of federally-mandated channels for distance learning.

3. You mentioned in your testimony that all cable companies have committed to serving every school by 1992. Do you think this will happen? Is there anything Congress should do to encourage this? Will cable companies charge schools for this service? If so, approximately what will the cost be?

A. At the present time, cable operators serving approximately 90 percent of the country's cable households participate in Cable In The Classroom and have committed to connect by December 1992 all of the accredited junior and high schools reached by their cable systems. These companies represent virtually all of the country's largest cable operators, and the ranks of Cable In The Classroom members continue to grow. The Cable In The Classroom project also has mechanisms in place to confirm that its goals are achieved.

I want to underscore the fact that this commitment represents free access to educational programming for these schools. Cable operators do not charge schools for the programming provided by their systems. Some cable systems also provide internal wiring at sharply reduced costs to the schools, creating a closed circuit network for programming that is produced by the students themselves. In addition, many cable systems have donated video equipment and pay for program guides and support materials that can be utilized by teachers who incorporate instructional programming into their existing curriculum.

Through ME/U's affiliation with TI-IN, cable operators now have the ability to also offer distance education to the schools they serve. The availability of these courses via a free cable connection eliminates the need for schools to invest in a more costly (up to $15,000) television receive-only TVRO) satellite antenna.

By sponsoring legislation that requires cable system operators to include distant education networks on their channel lineups, your committee, and the Senate as a whole, would ensure that the resources of this communications infrastructure were fully applied to the goal of broadening the reach of distance education.

4. In your testimony, you mentioned that Jones Spacelink or the ME/U donates in-kind services, like open channels, for educational use. What is the nature of these donations, and their approximate value? You also stated that you do not expect to be able to continue this indefinitely. If you are no longer able to donate these services, do you have any estimate of what the cost to a school would be to stay "on line"?

A. As part of their local franchise agreements, and in accordance with the 1984 Cable Communications Policy Act, cable operators set aside channels for public, educational and government (PEG) programming. Although the channels are primarily utilized for locally provided "access" programming, the remaining intervals may be used for carrying program networks such as ME/U. In order to widen the availability of our distance education programming, we currently do not charge local access organizations who carry our signal on educational access channels. However, once the channel capacities of cable systems increase, enabling the system operator to designate a channel for ME/U on a full-time basis, we expect to be carried directly by the system operator, who would reimburse our network a few cents per month per customer. Schools would not be charged for carriage of ME/U; we would be part of the complimentary package of cable programming they receive from their local system operator.

Our current policy of not charging carriage fees to nonprofit access corporations amounts to an estimated $2 million per year. As part of Glenn Jones' vision to *"Make All America a School,"* ME/U also has contributed $1 million to The Library of Congress in order to establish "The Global Library Project." The project's objective is to revitalize interest in the resources of public libraries by creating informative and entertaining television programs concerning the treasure of the world's greatest library, The Library of Congress.

5. Do you know what arrangements other cable companies have made with school districts? What kind of a break, if any, are schools getting financially? Is there such a thing as an "educational rate" like we have commercial or residential rates for phone service?

A. I am not aware of any cable system in the country that charges a local school for access to the educational programming it carries. Copyright restrictions preclude cable systems from offering free to public institutions some programs, including those offered by premium entertainment channels, such as HBO, Showtime and The Disney Channel. But even these networks have programs to encourage their utilization. Based upon the industry's commitment to provide educational programming, as exemplified by Cable In The Classroom, I think it is reasonable to expect that local cable operators will continue to provide free cable service, including free maintenance and free basic cable programming, to the schools they serve.

6. What are the barriers that you see to increased use of telecommunications by the schools?

A. One of the greatest obstacles we have faced has been the lack of knowledge among school personnel concerning the distance education resources that are available. This is particularly true with respect to knowledge about the potential applications of this new technology for broadening the curriculum they can offer their students and its role in providing staff development training for teachers.

The members of this committee and your colleagues in both the Senate and The House of Representatives could be very helpful to us in overcoming this barrier. By sharing your knowledge about distance learning opportunities with your constituents, through your communications and during visits with educators, community leaders and other constituents who are concerned about education, you would help us to increase their awareness about this wonderful resource for lifelong learning.

Our affiliates at TI-IN, who are routinely in contact with educators across the country, have also experienced the need for greater support from government and education leadership for distance education. The relatively small number of school administrators who have effectively integrated distance learning into their schools has done so by becoming personally committed to working with their teachers, students and parents, in order to optimize their acceptance and utilization of distance learning programs.

We have also heard from teachers and administrators about the need for greater pre-service training for teachers on the methods for incorporating communications technology into classroom instruction. ME/U and Penn State University are currently developing a Masters of Education Degree focusing on the application of educational technology, which, combined with similar courses offered by local colleges and universities, should help to overcome this obstacle.

As we discussed earlier, funding for programs is also a major barrier for greater use of distance education courses by schools. At the present time, there is inadequate funding at the local, state and federal levels to foster the development of more distance education programs and ensure that they can be available for modest enrollment fees.

7. Does your technology lend itself to any kind of individualized service delivery, for example could a particular child receive a signal from his or her classroom if they were homebound for a short period of time?

A. One of the advantages of providing distance education programs via the medium of cable television is the potential to literally transform every living room into a classroom. The graduate and undergraduate courses offered on ME/U are design video-taped at the homes of our distance learners. We have also heard about a number of secondary school students who monitor college courses, on American history for example, in order to enhance what they are learning in school. Because TI-IN courses are carried on cable, students who are home-bound or in "home schools" also have the opportunity to monitor—or potentially to participate—in the accredited secondary school courses it offers. If a student does not have access to cable television, or if their cable system does not carry ME/U, either the ME/U or the TI-IN signals may be accessed via TVRO satellite equipment. We continue to hear from viewers who are monitoring our channel—and participating in our telecourses—in order to improve their skills. They include families that want to improve their French in advance of their summer travel to Europe, and people like Robin Pappas, who took courses on accounting to improve the management of her family business.

I hope that my answers are helpful to you and the Committee in finalizing the reauthorization of legislation for the Star Schools project. Please let me know if I may provide you with any additional information.

Sincerely,

GREGORY J. LIPTAK,
*President.*

SCIENCE, EDUCATION AND TRANSPORTATION,
*May 14, 1991.*

HON. EDWARD M. KENNEDY,
*Chairman, Committee on Labor and Human Resources,*
*Washington, DC 20510-8300.*

DEAR MR. CHAIRMAN: Thank you for the opportunity to testify at the Hearing on the Star Schools Assistance Program; it is always gratifying to know that our work is useful. The information in this letter is provided in response to your questions following the hearing. Please contact me if we can be helpful in any other way.

Question 1. How feasible is it to expand our use of the Star Schools technology to serve additional populations, like the illiterate, as Dr. Miller discussed? Will this detract from our efforts to serve students in grades K-12—can we really do both?

There are many needs in education, and it is always possible that successful programs will be handicapped by being expanded beyond their capability. Our experience in preparing *Linking for Learning* suggests that the great capacity of telecommunications technology does make possible program expansion without diluting the principal objective—delivering instruction to kids in school. More human resources and more funding are required, however, to extend hours of operation, reach new sites, build in additional use of technology for delivery of programming (e.g., hooking into the local cable systems), or explore use of computers and interactive technologies in the distant site.

We believe it would be valuable and feasible to expand the use of Star Schools technology to serve non-school learner populations, including homebound and disabled students, and youngsters in detention centers and in prisons. These non-school learner populations would benefit from programming and activities that have already been developed in the areas of mathematics, science and foreign languages. Existing systems that serve youngsters could also serve adults in the community during non-school hours, offering a variety of parent education, adult education, and English as a Second Language Instruction, for example.

Question 2. What are the ways you have found most effective in bringing in the private sector? In very poor areas, there may not be businesses thriving and able to make these kind of contributions . . . what happens to the schools in these areas when Federal funds run out?

While there may not be thriving businesses in every locality, there are still potential partners for distance learning—the telecommunications providers. These include the local telephone company or rural telephone cooperative, the cable company, and others. The Panhandle Shar-Ed Video Network, although not funded by Star Schools, is a good example. A partnership among the local telephone cooperatives and 4 school districts developed a state-of-the-art fiber optic television network to serve an extremely remote rural area. These kinds of partnerships should be encouraged.

Funding at the State level may also become a critical factor over the long term. Several states are making significant investments in development of the distance education infrastructure as one way to assure equity of resources in education. States should be encouraged to build on the Star Schools Infrastructure already in place, just as Star Schools projects should build on existing structures.

An important consideration for the future is the issue of educational rates for telecommunications use (telephone, cable, satellite). Development of educational rate structures at the Federal and State level would help to assure affordable and continuing access to the Star School Program's investment in infrastructure.

Question 3. Mrs. Carson, you mentioned that students who take distance learning courses have to work a little harder than other students. Does this mean that these courses really only can be taken by more advanced students, as most of the courses are now geared? Is there a way to use distance learning to teach, for example, remedial courses?

Not only content but structures can vary in order to provide various types of services to children in at-risk situations. Let me add that thinking of these services as "remedial" is much less useful than thinking of them as helping all children experience the same success in learning, and the same resource-rich environment, that more affluent children commonly enjoy.

A number of projects, including several of the Star School efforts, are intended to provide opportunities for all students. The TI-IN Star Schools courses in physical science, pre-Algebra, and Spanish were designed for "average" students. The Kidsnet Star Schools Program in science captured the interest of a wide variety of students in affluent, middle class, and poor communities. The Jason Project activities, mentioned in our written testimony, provide many opportunities for enriching the

teaching of science, social studies, and literature at many different levels and for all students.

Several school districts, including Los Angeles County, run after-school homework hot lines and tutoring sessions over their telecommunications networks. Students who need extra help and explanation are calling in.

This year, the TI-IN Network, a Star Schools grantee in the first round of funding, is offering an experimental remedial course in reading and mathematics, called "Project Smart." A central component of the course is a 25 minute daily broadcast from TI-IN. This broadcast goes to 50 students in 7 high schools in the Odessa-Midlands area. Participating schools identified those students who were "most at risk" for dropping out. The course is aimed at preparing these students for the Texas examination in reading and mathematics, required for high school graduation. The TI-IN teacher also visits each of the remote sites and spends a great deal of time talking to students after class. In addition, a certified teacher at each location provides daily instruction with materials provided by TI-IN. Thus far, the effort appears to be very successful; students are involved, highly motivated, and staying in school. Whether this kind of course could be offered to more students in more locations is a concern; TI-IN staff emphasize the key role played by the distant teacher and her emphasis on interaction with students during and after the broadcast. It might be possible to reach more students with an electronic network support system or other means.

Question 4. What kinds of evolutionary changes do you see taking place with distance learning in the future? What limitations on the use of distance learning are there?

We will continue to see new ways of brokering educational services, involving schools, regional educational agencies, higher education, private providers, museums, and other institutions. If distance learning opportunities are to reach more schools and communities, providers and systems need to be better connected to each other and to the recipients.

Experiences with the Star Schools projects and other efforts will provide a better understanding of the learner in these settings, roles for teachers, and how to structure interaction and contexts for learning. Much can be learned from the teachers, developers, and students who are experimenting with this new educational resource. These participants as well as those who are evaluating current experiences with distance education systems are the experts. Their experience and knowledge should be shared and used to improve and expand distance education.

All aspects of distance education—infrastructure, programming, and operation—will continue to require funding. Individual schools and districts cannot carry these burdens on their own. Furthermore, there are now state policies that limit the applications, efficiencies and availability of distance learning options. These include state regulations on certification, curriculum, control, and textbook selection. The conflicting and complex web of intrastate and interstate telecommunications policies will continue to create difficulties.

Nevertheless, it is still the face-to-face student/teacher interaction in the classroom that remains the heart of the educational process. Distance learning can be a tool for meeting some needs in education, but should not be thought of as an all-purpose solution.

Sincerely,

NANCY CARSON,
*Program Manager.*

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SATELLITE EDUCATIONAL RESOURCES CONSORTIUM,
COLUMBIA, SC 29250,
*May 7, 1991.*

U.S. SENATE,
*Committee on Labor and Human Resources,*
*Washington, DC 20510-6300.*

ATTN: AMANDA BROUN: Responses to additional questions posed by Senator Kennedy subsequent to the testimony of Gary Vance on April 24th before the Senate Labor and Human Resources Committee.

Question 1. A major direction for distance learning is the journey into uncharted waters of possibility and exciting change in education. The true excitement of what we are involved in is the vision of what can be done to bring an excitement and responsiveness to the learning process that can only come about through the power of communication afforded by distance learning initiatives.

There are a tremendous number of unserved learners in this country, not only in the areas you mention, illiterate and non-English speaking, but in the very populations we were charged to address. I disagree with those who say additional satellite downlink installations are not necessary. For many schools this capability is beyond their reach without help. The private sector will not be able to address the total need for equipment, either, especially in rural America. At the same time cable penetration covers a very small percentage of those needing service, especially in rural areas. SERC is actively developing experimental models and is working to increase the installed base of potential users. Both are important. Both need support. Both needs must be addressed to reach the full potential of what has been started.

Question 2. The feasibility of expanding Star Schools technology to serve additional populations is a natural evolution of what we are about. SERC, for instance, is currently looking at ways to address adult populations through GED offerings. It only makes sense to use an existing technology platform across the broadest spectrum possible. We must make sure, however, that we grow in a deliberate, well-planned manner and until we reach a critical mass in our installed base of learners served, we need federal support to bring this about. Let us not make the mistake of reacting to the possibilities of technology. Let us make sure we continue to use the tools to address identified needs as we continue to expand our knowledge of how best to meet those needs.

Question 3. There is a role for the private sector in providing distance learning resources. The private sector has a vested interest in helping develop a pool of well-educated, productive citizens. The education community will welcome the infusion of support from the private sector if it is convinced the private sector will not drive the decision making process to the point that private interests supersede the needs of a given population. It is for that reason I implore the Congress to leave the decision-making power in the hands of the non-profit sector. Decisions based on the collective wisdom of a team composed of educators, technology experts, and, further following the SERC model, private sponsors committed to serving America through education will be driven by needs of the education system. To date, SERC has a partnership with Sony of America and has received foundation support from the Dodge Foundation. We continue to vigorously pursue other private partnerships. We do agree this is much needed if we are to continue to grow and succeed.

The question, "what happens to the schools in these areas (those without a strong base in the private sector) when federal funds run out?" is a critical one. It has been SERC's position that federal support is needed for startup and expansion to the point where an organization like SERC can be self-sustaining. There is an economy of scale in distance learning that provides tremendous relief to those individuals who will benefit from it. Once the base of those served has reached sufficient levels, costs decrease for everyone since much of the cost of distance learning is fixed. Again, Congress can best help by helping us expand that base. Operational costs can then be sustained through user fees and support from the private sector.

Question 4. Ms. Carson mentioned that students who take distance learning courses have to work a little harder than other students. I would suggest that distant learning students don't work harder, they work differently. Students in distant learning courses take more responsibility for their own learning. They work together in cooperative groups. They question and seek in areas beyond the classroom. This style of learning is quite different from a classroom situation where typically the teacher is in control and students may abdicate their responsibility for their learning. The focus of our work with distance learning has been to work with advanced students. Those were the ones who most directly benefitted from our original mandate and those were the ones who could most easily adapt to the "unknowns" of distant learning. There is no reason to think, however, that the same type of learning environment will not work for remedial students. Students at all levels respond to a system that believes in them and gives them responsibility, and credit, for succeeding. Distance learning can serve remedial students. There will be lessons for all of us to learn as to what works best, but we will experience the same kinds of success.

Question 5. There will be much evolution in the field of distance learning in the future. That is why Congressional support is so critical at this point so we can learn how to work most effectively as the technology opens up new possibilities. Sn the area of satellite delivery, compressed video will dramatically lower the costs of transponder time in about 5 years as a single transponder can be used for the delivery of up to 8 or even 16 signals at the same time. Fiber optics will continue to play an expanding role offering increased capacity for delivery as well as greatly increased capability to use 2-way communication where appropriate. All of these ad-

vances will lower the cost of the delivery system to present and unserved populations.

Again, it is clear that technology will open up new possibilities. The change, however, will occur in content and teaching methodology. How much of a given course needs to be interactive? What kinds of student feedback are the most effective? What should be the role of the computer, which can adjust to individual progress and learning style? The combination of prescriptive learning using a computer coupled with distant access to live resources will be a powerful one indeed.

Question 6. Distance learning is limited by the access we have to the tools. There is a need for hardware to link the learner to the teacher. This includes additional satellite downlinks, additional transponder time and access to other distribution systems such as cable, ITFS and fiber. The need for additional downlinks is obvious. More schools, and other institutions, will be able to use the resources. Institutions are also restricted, however, by limits of sections or times when these live resources are available. Support for additional sections, time slots and the ability to reach all 4 United States time zones will greatly enhance our ability to reach the greatest number of learners, thus, bringing costs down for everyone and leading toward further self-supported operation.

Given the arguments that distance learning does not replace the classroom teacher and that initial costs can be high, the fact remains that distance learning is the only solution we have found to date for meeting critical needs for education in areas where there are simply not enough teachers available to do the job.

I hope this information will be helpful as this Committee continues this important work.

Sincerely,

GARY N. VANCE,
*Executive Director.*

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SOUTHERN NEW ENGLAND TELEPHONE,
NEW HAVEN, CT 06510,
*May 13, 1991.*

HON. EDWARD M. KENNEDY,
*Chair, Committee on Labor and Human Resources,*
*Washington, DC 20510-8300.*

DEAR SENATOR KENNEDY: Thank you for the opportunity of testifying before the Committee on Labor and Human Resources an behalf of SHET—Southern Hew England Telecommunications. It helped to highlight, for me the unique capabilities, as well as, the differences that exist among the spectrum of telecommunications providers involved in distance learning applications. The possibility of enabling the demonstration of those differences/alternatives through another round of Star school grants in which the local telephone companies could participate is certainly exciting from our perspective.

Before responding to your questions, I would first like to state some of our general findings from the SNET Links to Learning project effort. We found that telecommunications technology is a tool which can help educators transform their classrooms into compelling learning centers for the students of today and tomorrow. However, the tool can only be effective if educators have it available to them and then choose to use it.

We also found through our SNET Links to Learning efforts that for educators to embrace any technology, it must be proven as an *effective* and *economical* tool which can be *easily used* in the classroom and which produces results of equal or better quality than today. Furthermore, it must *solve a problem* which educators view as important; technology utilization cannot be increased simply by espousing technology for technology's sake. The criteria of *availability* rounds out the equation for successful technology adaptation.

I would like to commend your efforts in promoting the educational use of telecommunications technology throughout America; the grant process and associated national funding are paramount to the advancement of technology use in the schools. I hope that the following responses to your questions are helpful to the commission in your process to reauthorize the Star School funding.

Sincerely,

WILLIAM F. WERWAISS,
*Assistant Vice President.*

1. Q. Will the proposed reauthorization legislation encourage the type of distance learning instruction SNET is currently involved in within Connecticut by giving a

priority to Star School applicants which include a telecommunications entity willing to donate in-kind services to the networks? Will this do the trick? Is there more we can do to increase this kind of involvement?

A: Yes, if priority is given to Star School applicants which include a telecommunications entity willing to be a partner in a consortium and donate inkind services, and if that priority is not cancelled out by the current priority for multistate consortiums.

From SNET's perspective, we can only provide distance learning via our telecommunications infrastucture within our state; inter-state communications is provided by long distance carriers (ATT, MCI etc.). SNET involvement would be possible only in a proposal involving a consortium of Connecticut entities; but we believe a statewide proposal could be beneficial and more discretely tailored to the needs of our state. Different from the current Star Schools production studio classrooms, such a Connecticut proposal would rely on local classroom teachers teaching from their own classrooms and would provide an additional model for educators considering distance learning. The expansion of current Star Schools would tend to reinforce those models and their telecommunications service providers as the models of choice.

2. Q: Does SNET donate in-kind services like phone lines for educational use? Do schools pay anything for these lines? If so, approximately how much?

A: SNET cannot donate any tariffed service such as a phone line. Instead, we provide competitive dollar grants for K-12 educators who need seed money to get started in using telecommunications technology. A portion of this money may be used to install and maintain phone lines, etc. A special grant provided the funds to establish the 2 video distance learning networks which are currently supported by SNET.

We do provide the following in-kind services of: half day to 3 days of teacher training on the use of telecommunications, on-line data bases and video distance learning equipment to K-12; seminars on telecommunications and educational uses of telecommunications for both K-12 and college educators; consultation to schools who are planning for new uses of telecommunications, and building or renovating existing schools. (Many K-12 schools still have only 1 or 2 lines in the school and have very little experiences with telecommunications in general.)

The current rate for a single phone line for a school is approximately $40.00 a month.

3. Q: What kind of a break, if any, are the schools getting financially? Is there such a thing as an "educational rate" like we have commercial or residential rates for phone service?

A: Currently schools are charged the same rates as the commercial rates.

There was a "governmental rate" at one time which provided discounted rates to all municipal entities including education. However, this rate was abolished by our state regulatory agency many years ago. In our latest rate hearing, the Connecticut Commissioner of Education asked that a discounted educational rate be reinstituted. This latest request is pending before the regulatory agency.

4. Q: What are the barriers that you see to increased use of telecommunications by the schools?

A: Based upon input received from participating educators and project manager's viewpoints, we feel that the major barriers include:

1. Costs-The affordability of equipment and services can exclude schools from considering telecommunications.
2. Teacher training and support—Educators must be provided adequate training and support, not only at implementation, but ongoing support during the initial years of use.
3. Teacher preparation—Higher education must recognize the need to provide up-to-date technology courses for prospective teachers.
4. Lack of planning—Most schools have yet developed a formal long range technology plan.
5. Piecemeal approach to technology integration—Within individual schools (one teacher uses computers extensively while another ignores them); among schools, we see schools that are always attempting new methods and approach technology as an opportunity while others continue to perform with current resources; finally, across the nation, there is no direction or approach for technology use in education.
6. Administration support—The introduction of technology must be supported by the decision-makers. Administrators must actively support efforts at introducing effective technology solutions into the curriculum.

In addition, other concerns affecting the deployment of technology include the educators' fear of technology, the availability of time for educators to learn the technology, and the amount of curriculum time to use technology with students. Finally,

since few schools employ technology consultants, educators can easily be overwhelmed with the amount of available educational technology to choose from.

5. Q: What kinds of programs work well in your experience? What needs improvement? What are your plans for future expansion?

A: What kinds of programs work well?

The SHET Video Link trial continues to be widely used by participating schools. Currently, there are 7 courses—Italian I, Russian I, Etymology, Russian II, Italian II, Astronomy, and Philosophy—being taught in the New Haven area using the fiber network. Many of the SNET Data Link and SNET Voice Link telecommunication efforts used by the educators also proved to be quite successful. Some examples include: electronic pen-paling with other schools throughout the world; use of on-line data bases as a research tool for the preparation of papers; participation in a stock market competition using on-line stock quotes as a tool; the use of interactive seminar programs such as National Geographic Kids Net in elementary schools; and the use of voice messaging as a parent-teacher link to improve home school communication.

Our evaluation at the end of the trial indicated that these activities were successful for a number of reasons:

—Educators were provided sufficient training to enable them to use the technology with students and ongoing support from educator discussion meetings, administrative support, and technical consulting.
—The educators were motivated to learn the technology and they were involved in determining how to use it.
—The educators used the services to fulfill a need.
—The cost was right. SHET funded the activities for the 2 year effort and schools were not concerned about the cost structure.
—The technologies that were used are available today and were not experiments.
—The technologies were relatively easy to use and educators felt comfortable with the services after initial training.
—Access to on-line data services was simplified by using the SNET statewide packet switched network—ConnNET.

What needs improvement?

In general, areas needing improvement are counter to the successes previously mentioned:

—In many trials, educators are given the technology but are provided minimal support, both at the beginning and throughout the project effort. Educators involved in a trial should have the opportunity to converse with other participants as the trial progresses. Currently, there is no easy way for educators to review projects with one another. A number of alternatives are available: periodic discussion forums, electronic mail connections; voice mail connections, or an electronic bulletin board to promote interaction of the participants.
—In order to recognize the diversity of schools throughout the nation, more emphasis could be placed on selecting schools that are "new" to technology; in our trial, participants were selected by SNET and the Connecticut State Department of Education using criteria to insure that urban, suburban, and rural communities were involved.
—Information on the progress of the many trials in education should be more widely distributed.
—Finally, the pricing of educational services should be more economically priced and flat-rated so that schools are not subject to prices which fluctuate based upon usage.

What are your plans for future expansion?

SNET continues to support the educational community through the sponsorship of a telecommunications incentive grant. $50,000 has been allocated to support schools interested in implementing telecommunications projects. In 1991, 13 schools received awards and are currently involved in their projects.

6. Q: Does the technology used by SNET lend itself to the kind of multistate networks that have been funded under Star Schools, or can they only be used in a more localized way?

A: SNET employed services and technologies which are available through the public switched network for all of the telecommunication trials—SNET Voice Link, SNET Data Link, and SNET Video Link.

*SNET Voice Link*

The public switched telephone network provides access to voice messaging systems. The user simply calls the service from any touchtone capable telephone from anywhere in the world to use the service.

*SNET Data Link*

SNET DataLink's main emphasis was to demonstrate the effectiveness of data telecommunications to schools. SNET's packet switched network—ConnNET—was used to provide telephone access from any school in Connecticut without incurring a long distance charge. This network was designed specifically to handle data telecommunications and has gateways to major interstate carriers such as Tymnet and Dialcom; on-line service providers such as Dialog and Dow Jones make their databases available by using these networks. For those on-line services which do not provide such access, the schools use the public switched network long distance and "800" services.

*SNET Video Link*

Two different technologies are being used in SNET sponsored video efforts—full motion video over fiber and digitally compressed video using higher capacity (T1 carrier) telephone services over existing copper telephone facilities. In both cases, the networks can be extended to other locations, but all participating sites must use compatible end user equipment.

*Video Fiber Networks*

The addition of fiber to the nation's telecommunicatlons network will provide a super highway for telecommunications. This network can be used to traffic voice, data, and video signals simultaneously by defining paths or channels for each application. It is technically feasible to extend our fiber video network to additional locations within the state and to interstate locations using fiber paths. In order to integrate these video networks with other interstate locations, 2 requirements exist:

1. Widespread deployment of switching equipment that is capable of processing the large bandwidth requirements of video telecommunications (which is currently under development);
2. End user video transmission equipment must be compatible to receive and decode other vendor's video transmissions; or

The national telecommunications network must be built with the internal ability to translate video signals from one manufacturer's format to another.

*Digitally Compressed Video*

SNET's compressed video link uses 71 facilities (a copper telephone line) uhich provides video quality which has proven to be acceptable for student use. These lines are universally available in the public switched telephone network. Digitally compressed video has been used by corporations for years to provide national and international 2-way video teleconferences. All major interstate carriers (MCI, SPRINT, and AT&T) have the ability to interconnect sites using their networks.

The major limitation of compressed video is the fact that all sites must be using compatible end user transmission equipment.

7. Q: Does your technology lend itself to any kind of individualized service delivery, for example could a particular child receive a signal from his or her classroom if they were homebound for a short period of time?

A: A number of opportunities to expand home-school links are available using today's telecommunications technology.

*VIDEO Opportunities*

Although technically feasible, the cost of providing 2-way interactive video between the home and classroom would be relatively high at this time. However, with the introduction of Integrated Services Digital Network, ISDN, into the public switched network, home school video could be transported using low speed transmission. In addition, the cost of end user video equipment continues to decline and will likely became an affordable expense in the near future.

A less costly option is the one way freeze frame video which sends the image of the teacher to the student used in conjunction with 2-way audio thus allowing the student to see and hear the teacher, and converse using the audio return. This technology uses regular phone lines for both video and audio.

*DATA Telecommunications Opportunities*

The use of data telecommunications from the home as a classroom interface can be implemented today through the use of a regular telephone line and modem. How-

ever, in order to maximize the usefulness of a computer interface, the lesson or instructional aids would have to be available in computer format. An audio link could enhance the arrangement by providing a 2-way voice connection to supplement the computer information.

*Audio/Voice Opportunities*

Homebound students could easily be linked with classes by using a simple speakerphone and a facsimile machine. This would permit the teacher and student to have constant audio contact and to transmit written materials dynamically; it may require more concentration from the student since there is no visual image to aid the instruction.

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MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS,
CAMBRIDGE, MA,
*May 15, 1991.*

HON EDWARD M. KENNEDY,
*United States Senate,*
*Committee on Labor and Human Resources,*
*428 Senate Dirksen Office Building,*
*Washington, DC 20510-6300.*

DEAR SENATOR KENNEDY: Thank you for the opportunity to address the committee with MCET's ideas about Star School reauthorization. We are pleased to contribute towards the development of a bill that will move the nation's educational system forward. The current Star Schools program you initiated has already had a major impact on schools' throughout the country, as was demonstrated so effectively at the hearings.

In response to your specific questions:

*1. Is there a way to reconcile the disparate views about curriculum focus?*

Gary Vance quite properly articulates the need for mathematics, science, and foreign language instruction in the nation's schools. However, it takes time, effort, and financial resources to create new courses. Of those courses that have been funded, many are of excellent quality and most are useful beyond the area covered by a single consortium. In addition, through Star Schools and other funding, there are now a sufficient variety of courses in these areas to give potential users a choice of approach or instructor.

With so many needs in education, particularly in basic literacy, access to existing courses should be an essential element in an overall strategy for educational improvement. Currently, sharing of existing courses is problematic with the idiosyncratic structures of the various consortia.

However, monies and leadership are necessary to provide information and access. Some ideas would be to:

Produce a regular (monthly) schedule of distance learning courses with additional access to schedule and program information through a national computer network.
Conduct a series of meetings to establish a frame work for comparable access fees, charges for courses, determination of chargeable unit (i.e. students, downlinks, school system, community).
Articulate a plan that will spell out alternative strategies for sharing of present curricular offerings.

At the same time, there is pressing urgency for using distance education as an essential part of addressing the need for a more literate public. No one course or technology will be a panacea to the needs of this diverse audience. Literacy is the building block upon which all other curriculum areas are based. The Star Schools program needs new directions, while maintaining its present strengths. Teaching literacy and citizenship to a multigenerational audience using multi-technologies would be 2 important foci.

*2. Would expanding the audience detract from work with K-12?*

Although there is not a great deal of data about the limits of expansion or the optimum class size with satellite, telephone, or computer technology, the experiences of former Star Schools recipients indicates that effective expansion requires support structures, human and technological. If these are in place, neither present nor future students in any audience or learning environment will be shortchanged. With the Mass LearnPike, the scope and breadth of planned programming for 1991-92 exceed the ability of any one school, community, or state to absorb. Participatory programming quite logically requires many participants. We need additional stu-

dents from other states to make our own offerings educationally-effective and cost efficient. There is also the opportunity to repeat present offerings at different times for other audiences without the large development costs. We are preparing to do this for the TI-IN national audience in some subject areas. Finally, new audiences will allow us to reexamine learning from other perspectives. My expectation is that such research findings will have a powerful impact upon our primary constituency.

*3. How can the private sector help? What happens when the funding ends?*

Private sector assistance is not difficult to achieve if thinking is not in terms of major monetary donations. Schools need to be inventive and develop relationships with local industry and local business. In Massachusetts schools have promised the local beauty parlor and gas station spreadsheet help in return for computers, had technology "dinner dances", asked for the pennies in the motel wishing well. Local colleges have paid for satellite dishes for local K-12 schools in order to train their student teachers. Corporations like to acquire a dish for towns in which they are located. Police and fire departments have traded equipment purchase for access.

A school system in Michigan invited the entire Chamber of Commerce to a meeting to try out their new videodisk math curriculum, with third-grade students acting as aides. The fallout in terms of support was extraordinary. The cable industry has helped Massachusetts to maximize the installation of 120 satellite dishes to serve 500,000 children and countless adults. Now Nynex and New England Telephone will initiate demonstration projects in different towns, using MCET as the broker/researcher/program designer. Corporations will underwrite program development and production, particularly when they can see that small amounts of money or equipment serve a large audience effectively. They want to give their heads as well as their pockets, and have been invaluable to us in planning, in contacts, in publication, dissemination, public speaking, and so much more.

Every distance learning project must look at its stability and long-term viability without soft money. Although MCET receives an appropriation from the state legislature (demonstrating their responsibility to education), every dollar is matched by 2 from other sources. The sale of network membership, sales of programs, corporate underwriting, alternative programming in non-school hours at a fee, the afterlife of certain programs and products, rental of equipment, services, facilities, as well as foundation and federal support must come together in a comprehensive business strategy for a continuing revenue stream. Too much of educational innovation has withered and disappeared when federal money was ended. The test of at least a portion of our total educational package will be its portability and value to others.

*4. Does distance learning only serve the best and the brightest?*

Although this question was asked of Ms. Carson, it is one that I feel most strongly about. Our Star Schools programs and products were ALL designed for the Bart Simpsons as well as the Doogie Howsers. We have found that technologies may be just another delivery system to the advanced student, while they are a lifeline to the less able. Distance learning may be able to replace the teacher in areas where there are no qualified staff. Satellite teaching, telephone communications, and computer networks support and enrich the lives of teachers who are in the classroom on a daily basis.

As the information explosion continues, communications technologies will prove themselves a necessary adjunct to classroom instruction, a partner toward providing excellence in fundamental curriculum.

*5. What does the future hold?*

We are only at Volume One of our experience in distance learning. It will be important to remain cognizant of new technologies, and the appropriate use of present possibilities. How can 2-way fiber systems be used for more than a dozen schools? Are there limits to one-way video, two-way audio in terms of numbers, kinds of programs, depth of learning? Will the telephone become an essential part of the educational program-touch tone, voice mail, picture telephones? What will compression, low-level satellites, split transponders bring to the menu of courses, classes, and individualized learning opportunities? Combinations of technologies, multiple cable channels, integration of broadcast and satellite, CD, DVI will begin to be more possible and viable. What about interactivity? Will devices like the keypad be replaced by others that allow for reflection and analytic responses? As computer networks grow and become more accessible to ordinary people, will interface devices change and be useful to education providers? Star Schools legislation must allow educators to begin to explore the parameters of these questions. This legislation has always stretched the frontiers of education, and allowed a diverse kind of exploration to

take place. Not to continue this would be to become a very different and perhaps redundant kind of program.

*6. Are there limitations?*

Certainly, we will and have found limitations to each communications technology. We may want to ask a different set of questions. How can we exploit available technologies? How can we combine available technologies? How can we demand that the creative and inventive geniuses of our society produce technological tools that will accomplish national educational goals as they have been created to fulfill defense goals?

Senator, you have always said of this legislation—"We want Star Schools, not Star Wars." I want Star Tools, not shut doors to using communications as an investment in the future of the nation, and perhaps the society.

Once again, thank you for the opportunity to provide my input.

Sincerely,

INABETH MILLER,
*Executive Director.*

The CHAIRMAN. The committee stands in recess.

[Whereupon, at 12:12 p.m., the committee was adjourned.]